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Getting Full Value Out of the Exhibit

IT is difficult to even begin to estimate the educational value of the big exhibition at Atlantic City. It has grown so steadily and to such an extent that it is really confusing to the average railroad officer or foreman, unless plans are carefully laid to cover it systematically. Different roads have tackled the problem in different ways. The New Haven group, for instance, after its members had looked over the exhibit, got together on Saturday morning and each member of the group told of the particular things that had made the biggest appeal to him. After the conference each man in the group was asked to take the other members to the exhibit in which he was most greatly interested, demonstrate it to them

and tell why he believed the device or piece of equipment was of special value to the road. As another example, members of the Delaware, Lackawanna & Western group have been requested to make written reports of those things that make an impression upon them at Atlantic City and it is the expectation that this will be supplemented by discussions at the staff meetings. Quite a number of railroads are following similar practices. Possibly the hardest taskmaster is John Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe. He turns up at the Million Dollar Pier with his group at an unearthly hour in the morning and they keep hard at it all day. This is because of the recognition on the part of Mr. Purcell that the exhibit at Atlantic City offers remarkable opportunities in the way of studying the advances which are being made in the art of railroading. In other words, the exhibit, rightly used, is almost the equivalent of a short intensive university course in the progress of the mechanical and allied departments.

The Locomotive Market

ELSEWHERE in this number is the announcement that the Illinois Central has placed an order with the Lima Locomotive Works for 50 locomotives. This order, which will involve an expenditure in the neighborhood of \$5,000,000, is one of unusual import. Railroads are not in the habit of obligating themselves to the extent of this amount in a single order without having reasonable assurance as to the soundness of the step. This action of the Illinois Central, therefore, attests to a confidence in the future that is bound to exercise a wholesome influence in various quarters. It is evident that the Illinois Central has found no occasion to retreat from the numerous public expressions of optimism concerning conditions made by President C. H. Markham since the first of the year. This locomotive order, however, derives its significance particularly from the extent to which the action of this road harmonizes with trends already projected. It is recalled that in February of this year unfilled orders on the books of the American Locomotive Company exceeded all of the orders placed with this company during the preceding year. Only recently Samuel Vauclain of the Baldwin Locomotive Works issued an announcement to the effect that the unfilled orders for locomotives on the books of this company at that time were greater than at any similar time since 1922. Unfilled orders with American builders for the month of May of this year, which is the last month on record, comprised 726 locomotives of all kinds for domestic and foreign markets, as compared with 478 for the month of May, 1925, while the number of unfilled orders for steam locomotives purchased in this country amounted to 585 in May as compared with 324 in the same month of 1925.

The Scope of the Bus and Truck Exhibits

THE exhibits of the bus and truck manufacturers and the manufacturers of automotive equipment in the specially erected tent are strikingly complete. No type of bus or truck is missing. In the motor bus line, the visitor will find all sizes and types. There are the small buses with seats for 14 or 15 passengers, and large buses with seats for 28 and 30 passengers, and plenty of in-between sizes. There are city type buses which make a strong point of quick loading and unloading, and parlor type buses which point with pride to their luxurious in-

terior and easy riding qualities. There are even buses with observation ends. Among the trucks will be found all sizes with capacities of from one ton to fifteen tons, if tractors and trailers are to be considered as being strictly within the category of trucks. There are special exhibits of bus bodies, bus tires, axles and other parts that go into the making of the complete highway carrier of passengers. In a word, there is everything in the exhibit that should be there. Its completeness makes a visit to it by every one at the conventions most worthwhile.

The Exhibits in Machinery Hall

THOSE in touch with the development of machine tools adaptable to railway shops will readily observe that this year's exhibit in Machinery Hall is by far the most elaborate that has so far accompanied a Mechanical Division meeting. The demand for increased space necessitated such an expansion that it was necessary for the machine tool exhibit to occupy somewhat temporary quarters. This, however, has not entirely had its drawbacks and this year many of the companies which in the past years have been prevented from exhibiting some of the heavier machines, because of the necessary limit of floor loading on the pier, have been able to bring several unusually large types to the convention. Among the exhibits are not only many new machines of greatly improved design, but also demonstrations of increased productive capacity of machine tools by the use of more up-to-date methods. The adaptation of milling machines and grinders to many new jobs and the greatly increased range of work on turret lathes may be seen. Machine tools perform such a vital part in the maintenance of motive power and equipment that a shop supervisor must, of necessity, be familiar and keep in touch with the continued development of modern machinery. It is a noticeable fact that many of the roads are sending groups of their younger men to the convention this year. Here is an opportunity for the machine tool builders to render an educational service in acquainting them with the productive possibilities of their products, and, providing the opportunity is intelligently embraced, the foundation can be laid for the more intelligent selection of tools which are known to be adaptable to the job in hand and in a manner that will eventually insure the mechanical department getting the machine tools it needs.

Standardization—Its Relation to Passenger Traffic

FROM the standpoint of competition, standardization has its disadvantages as well as its advantages and both must be given consideration, especially in the case of passenger cars. The increased utilization of the automobile and motor bus by the traveling public, together with the effort on the part of many railroads to attract passenger business with equipment of luxurious design, additional express trains and the shortening of time schedules, promise to make the factor of competition of considerable importance from the standpoint of the standardization of passenger car parts and fixtures. Many of the advantages of standardizing box cars and other equipment interchanged between railroads do not apply to passenger cars, as they rarely leave the lines of the owners. Nevertheless, there seems to be a tendency on the part of some of the larger railroads, where the

maintenance of passenger equipment is a considerable problem, to go almost too far, especially in the standardization of coaches. A disadvantage in this is that there is always a delay in adopting new and improved equipment. In order to hold its passenger business as well as to get new business, a railroad must be able to offer as good or better facilities in the way of comfort and conveniences than its competitors. To do this there must be sufficient flexibility in the design of the passenger equipment to permit alteration of such parts as seats, windows, interior arrangements, etc., intended for the comfort of the passenger. The average passenger cares little about the maintenance problems of a railroad. He does not know whether the passenger car in which he rides is standardized or not, and cares less. The only thing he is interested in is the comfort, easy riding and speed with which the train gets over the road. If the railroad does not provide the service he can get elsewhere it is not long until he has changed his riding habits. There are many parts of a passenger car that can be standardized to advantage. But standardization of equipment designed primarily to provide comfort and convenience to the passenger should not be carried so far that it cannot be changed to meet the demands of competition before the competition has had time to get in its work.

Type D Coupler a Proved Device

THIS year's report of the Committee on Couplers and Draft Gears affords among other things concrete proof of the fundamental correctness of the Type D coupler. As was brought out in the discussion of the report, still further refinement can be and is being made in the design of certain coupler details which will tend to promote even better service. The report shows, however, a very low percentage of failure which is certainly highly creditable to the general design and those responsible for it. Almost three millions of these couplers have been applied to cars since 1916 and, in a test covering six months on railroads representing 38 per cent of the total car ownership in the United States, the report shows a total of but 1534 couplers with 5 in. by 7 in. shanks removed and 906 couplers with 6 in. by 8 in. shanks removed. The total is 2440 failures. This represents a failure of hardly more than two couplers in every 1000 applied and indicates that such troubles as exist in the connection of cars in long heavy freight trains has been largely transferred to points other than the couplers.

Objectives in Fuel Saving

THE value of setting definite objectives in any important line of human endeavor has been demonstrated time and again, and it does no harm if each objective is for the time being slightly beyond the possibility of attainment. The impossible of one year becomes the commonplace of the next, a fact never more forcefully illustrated than in records of locomotive fuel performance. Fuel consumption per thousand gross ton-miles in freight service on Class I railroads decreased from 186 lb. in 1922 to 182.4 lb. in 1923; 169.9 lb. in 1924; and 158.9 lb. in 1925—the total decrease from 1922 to 1925 being 14.6 per cent. This saving in fuel during 1925 was no doubt responsible to an appreciable extent for the favorable operating showing made by many roads. It was possible only by setting definite objectives in fuel

performance, making an organized effort to reach these objectives, and stimulating interest by means of wide publicity given to the progress made and advantages to be gained. One railroad, for example, in the Southwestern region decided to attempt a definite money-saving by reduced fuel consumption in 1926 as compared with 1925, the quota to be saved being figured for each of six districts on the system, based on the average price of fuel and assuming a ten per cent saving per thousand gross ton-miles in freight service, per car-mile in passenger service, and per switch-engine-mile in yard service. The system quotas to be saved in the first quarter of 1926 in the three classes of service mentioned were \$65,611, \$30,956 and \$19,575 respectively. The amounts actually saved were \$26,419, \$31,695 and \$24,829 respectively, the quotas being more than reached in passenger and yard service. In freight service it will be noted that less than half the quota was saved and presumably a concerted attempt is being made to better this performance in the second quarter. Is your road achieving similar results by working toward definite objectives in fuel economy?

Give the Young Member a Job

IT seems to be a regular part of the program of the average railway association for the older and more established members to invite younger members to take part in the discussion of the various reports and papers. The response to these invitations, however, is not as general as might be desired. The average young man working to get ahead is not anxious to make a bad impression on his superiors and he realizes that it is not hard to do, especially when speaking before a meeting. Furthermore, few men desire to comment on a subject, especially for the first time, unless they know thoroughly what they are talking about. Much of the committee work is performed by older men and, of course, they can take a more active part in the sessions, as they are more familiar with the subjects being discussed. One of the interesting developments in the railway field has been the large increase in the number of young men in the minor executive positions. The association that really wants to enlist the services and interest of the younger men can accomplish its purpose to a large extent by appointing more of them members of working committees. Committee work is a big incentive in arousing the active interest of the younger men, and the association needs the energy which they can supply. Give the young member a job!

Roller Bearing Exhibits

THE growing interest in the application of roller bearings to car equipment is indicated by the roller bearing equipment passenger car trucks included in this year's exhibit. It is safe to say that more progress has been made during the past two years in the perfection of the anti-friction bearing for trucks than all of the progress made during the last fifteen years. Since 1924 attention has been directed to the improvement of the chemical analysis of the steel used in the bearings and to refinement of workmanship and the proper design to take care of the end thrust. At first the manufacturers used stock commercial steel for the rollers, but it was found that the steel did not have the physical characteristics to withstand the severe loads imposed on it in railroad service. Marked progress has been made in the refinement of the steel now used, with the result that trouble from this

source has been materially reduced. Again, inferior workmanship caused considerable trouble. This has been overcome by specially designed machine tools and highly trained workmen. End thrust has been the weak point in the design. The manufacturers have made marked progress in overcoming this objectionable feature. The fact that many railroads have one or more passenger cars equipped with some type of anti-friction bearing is indicative of a growing realization among railway men of the possibilities offered by anti-friction bearings for reducing starting resistance, for increasing train lengths, and for reducing journal box maintenance costs and hot boxes. Interesting service data should be developed within the next year or two which should add materially in perfecting anti-friction bearings for railway utilization.

The Purchases and Stores Meeting is Over

THE annual convention of railway purchasing and stores officers was concluded Friday and most officers in attendance have returned home. These officers had a big meeting, and the store officers particularly are to be commended for the interest taken in the work. Throughout the entire three days there was ample evidence that stores officers are striving with the greatest earnestness to meet the problem of an efficient service of supply. In view of this, it is regretable that the demands upon the time of the mechanical officers, which are made by their own convention, prevent these officers from following more closely the discussions of the purchase and stores officers. It is impressive how these officers in their committees and association work are studying the mechanical departments in their effort to render the service which this department must have to function efficiently. This aim to be of service is evidenced in almost every phase of their investigations and discussions. The pronounced degree with which stress is laid upon it and the manifest sincerity of purpose in enlarging it ought not to pass unnoticed. It challenges recognition.

Too frequently mechanical officers seem to visualize their stores officers as a hindrance, rather than a help in the accomplishment of their plans. They are aware of efforts made to reduce stocks. They are confronted repeatedly by an inadequacy of supplies, by the necessity of substitution, etc., until they reach the point of placing the stores officer in the category of persons who consider material more important than the work for which it is ordered. To some extent there is a basis for such impressions. Stores officers have their responsibilities to meet even as the mechanical officers have theirs to meet, and the responsibilities often result in conflict of interest. It is to be emphasized, however, that very frequently these conflicts can be avoided with the co-ordination of effort that results from a sympathetic understanding of each other's problems.

Mechanical officers expect stores officers to meet their obligation to the users of material, but mechanical officers will do well to remember that in fulfilling his responsibility the stores officer has a right to expect co-operation from the mechanical officer. There are many reasons why mechanical officers should remember this, not the least of which is the better results which the mechanical department will obtain where reciprocal obligations are recognized and met, but particularly do they owe it to stores officers to show in a practical way their recognition and appreciation for the service which these stores officers are demonstrating in all of their activities to be an outstanding objective of their study and effort.

Today's Program

DIVISION V—Mechanical, American Railway Association, will hold its fourth session. The Association of Railway Electrical Engineers will also hold its semi-annual meeting.

Mechanical Division

Division V—Mechanical, American Railway Association, will meet in the Convention Hall of the Million Dollar Pier at 9:30 a. m., Daylight saving time. The session will adjoin at 12:30 p. m. The program follows:

Discussion of Report on:
Locomotive Design and Construction.
Election of Officers.
Discussion of Report on:
Wheels.

Electrical Engineers

The Association of Railway Electrical Engineers holds its semi-annual meeting this morning at 9:30 o'clock in the Ozone Room on the eighth floor of the Hotel Dennis. The program is as follows:

Address of the President.
Report of the Secretary-Treasurer.
Unfinished business.
New Business.
Progress report of the committee on Safe Installation and Maintenance of Electrical Equipment.
Progress report of the committee on Loose-Leaf Manual.
Progress report of the committee on Illumination.
Progress report of the committee on Motors and Controls.

The complete A. R. E. E. committee reports were published in the June, 1926, issue of the Railway Electrical Engineer, copies of which can be obtained at the *Railway Age* office, booth No. 1, on the pier.

Entertainment

10:30 a. m.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3:30 p. m.—Orchestral Concert, Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4:30 p. m.—Tea will be served in Entrance Hall.
9:00 p. m.—Informal Dance, Special Features, Ball Room, Million Dollar Pier.

McBarmma Golf Tournament

THE annual convention tournament of the McBarmma Golf League took place at the Seaview Country Club on Saturday. Thirty-six holes were played, and as usual W. C. Conwell was the winner of the low gross prize. The low net prize was won by George Bishop. The Carr cup, given by Robert F. Carr for the low net score in the afternoon, went to Joseph Chidley, and the Sargent Luck Cup donated by George Sargent, was taken by W. L. Conwell.

Other prize winners as follows: Class A, first prize, Mr. Van Houten; second prize, N. M. Garland. Class B, first prize, Joseph Chidley; second prize, B. P. Flory. Class C, first prize, James Bateman, second prize, William Wood.

The new officers elected for the next year are: President, George Bishop; vice-president, C. R. Ellicott; members of executive committee, N. M. Garland and D. R. Mac Bain; secretary-treasurer F. V. Greene.

The fall tournament of the club will be held at Cleveland.

Lost and Found

LOST—Badges 5637, 5678, 7751, 8602, 8629 and 8929. Return to Secretary Conway's office.

FOUND—Two stick pins and one lady's scarf. Inquire Secretary-Treasurer's Office.

Special Trains Home

FOR the convenience of people returning to New York after the convention the Pennsylvania will run a special train leaving Atlantic City at 1:30 p. m., eastern standard time, Wednesday, June 16. Reservations may be made or tickets purchased at the Pennsylvania booth, located next to the enrollment booth, on the pier.

The Chicago special train on the Pennsylvania, as previously announced in the *Daily*, will leave Atlantic City at 5:45 p. m., eastern standard time, Wednesday, June 16, arriving at Chicago at 3:00 p. m. the next day.

Sales Representatives Meet

THE Independent Pneumatic Tool Company is making the convention an opportunity for its annual sales convention. It will be held in the Traymore Hotel. Twenty-two representatives of this company are in attendance here, including J. D. Hurley, president, R. S. Cooper, vice-president and general manager, R. T. Scott, vice-president, F. W. Buchanan, secretary, F. B. Hammerly, works manager and 17 other branch officers and salesmen. This company is very well pleased with the interest shown in the exhibits this year.

Registration Figures

THE registration at 3:30 p. m. on Sunday shows that, as has been anticipated, this year's convention is to far exceed any previous year in attendance. The registration of Division VI was greater than the total of two years ago. In fact every item of registration has shown an increase. Below are given comparative figures for the last four conventions:

	1920	1922	1924	1926
Division V—Mechanical	707	637	956	1129
Division VI—Purchases & Stores	140	49	176	450
Special guests	441	407	651	615
Railroad ladies	569	526	867	1000
Supply men	2262	2056	2467	2944
Supply ladies	634	501	648	690
Totals	4753	4176	5765	6828

Bathing Prices Go Up

ASTATEMENT on page 6 of the Program of Entertainment and Convention Calendar reads: "Bathing—Admission to Brighton Casino: Rooms and suits, 50 cents per person, including Indoor Swimming Pool and Surf Bathing."

Because of a change in management since the above arrangement was made, the price will be \$1.00, and for children, sixteen and under, 50 cents.

Saturday's Entertainment

SATURDAY'S entertainment features were interesting. The usual orchestral concert was given in the morning in Entrance Hall by the Samuels Musicians. In the afternoon dancing was enjoyed with tea and light refreshments at 4 o'clock.

In the evening a special musical revue was given under the direction of Miss Tulsa Lee. Interspersed dances in a program of twelve numbers "The Lenora Slippers", with Teddy Walters and Roy Ellis, little Evelyn Oakes, Ray Bolger and others, entertained in vaudeville sections to the enjoyment of the well filled hall. The second special feature was the performance of Percy Oakes and Pamela Delure and their Merimba orchestra, followed by Del Val Richards, the skating violinist. Teddy Walters also followed with a vocal solo.

Sacred Concert Sunday

A LARGE and appreciative audience attended the Sacred Concert at the Marlborough-Blenheim yesterday afternoon. The program included the following numbers:

1. Fantasie From Opera Faust	Marlborough-Blenheim Quartet	Gounod
2. (a) Ave Maria		Gounod
(b) Song of Songs		Moya
(c) Gianina		Frimal
3. Cello Solo—Variation Symphonique	Miss Beth McCoy—Soprano Mr. Leo Sachs	Bellman
4. (a) In Thee Oh Lord Do I Put My Trust		Frey
(b) Lift Thine Eyes		Logan
(c) On the Road to Mandalay		Speaks
(d) Less than the Dust		Findern
5. (a) Andante Cantabile from the String Quartet	Mr. Chester Moffett	Tschaikowsky
(b) Fairy Tales		Komzack
6. Piano Solo—Hungarian Rhapsody—Number 2	Marlborough-Blenheim Quartet Mr. Rudolph Hildebrand	Liszt
7. (a) Song of Love		Herbert
(b) O' Sole Mio	Mr. Chester Moffett	Di Capua
8. March from Tannhauser	Marlborough-Blenheim Quartet	Wagner

Big Locomotive Order

THE largest of recent orders for locomotives and one of the largest orders placed during the year is that just given by the Illinois Central to the Lima Locomotive Works for 50 locomotives of the 2-8-4 type. This order is reported to involve an expenditure of approximately \$5,000,000 and it is understood, will tax the capacity of the Lima Locomotive plant for the rest of the year. The locomotives will be duplicates of the Lima A-1 locomotive. They will have 28-in. by 30-in. cylinders, and 63-in. diameter driving wheels, and are built for operation under 240-lb. boiler pressure. They are equipped with a four-wheel articulated trailer truck with booster.

The railroad placed this order as the result of exhaustive dynamometer car tests of the Lima 2-8-4, A-1 locomotive. These tests were run on the Centralia and Clinton divisions, the characteristics of which afforded a wide range of operating conditions. The entire series of tests were run in regular everyday service during the months of January and February, 1926. The comparison was

made with the Illinois Central standard central type 2-10-2 locomotive.

The general results were an increase in tonnage of 5.75 per cent, an increase in speed of 19.4 per cent and a decrease in coal per 1000 gross ton-miles of 37.1 per cent. The A-1 handled during the winter weather tonnage in excess of the maximum summertime rating of the 2-10-2 class. The results of all tests showed a saving of about \$21 per day per engine for coal.

On the northbound movement (loaded movement) the A-1 showed 60,700 gross ton-miles per hour as compared with 48,590 for the Central type. Similar figures for the southbound (empty train movement) are 51,500 gross ton-miles per hour for the A-1 against 43,900 for the Central type.

The principal dimensions of the locomotive as compared with the Central type are:

	A-1	Central type
Type	2-8-4	2-10-2
Cylinders	28" x 30"	30" x 32"
Boiler Pressure	240 lb. (60% max co.)	190 lb.
Diam. of Drivers	63"	63"
Driver Weight	248,200 lb.	296,500 lb.
Total Weight	385,000 lb.	381,000 lb.

Great Northern Orders Motor Cars

THE Electro-Motive Company, Cleveland, Ohio, has just received a third repeat order for five gas-electric motor cars from the Great Northern. When this equipment is delivered the Great Northern Railroad will be one of the largest, if not the largest, operators of gas-electric motor cars.

Illinois Central Electrification

STUDENTS of electrification activities have been impressed by the rapidity with which the Illinois Central is pushing to completion the electrification of its large suburban service in Chicago. That nothing has developed in the last few weeks to change the plans of this road to place this district in service in July, is indicated by the report that on Saturday the lines from 102nd Street to the end of the district at Madison, a distance of about 15 miles, were temporarily placed in operation for testing purposes.

Missouri Pacific Buys Six Exhibited Machine Tools

SIX representatives of the Missouri Pacific, headed by the chief mechanical officer and the general purchasing agent, purchased six machine tools which are now being exhibited in Machinery Hall. One of the stipulations of the purchase contract is that the machines on exhibition be delivered to the railroad. They include a Bullard 24 in. vertical turret lathe; a Blacker hammer manufactured by the Blacker Engineering Company; a Monarch 20-in. by 12-ft. extra heavy engine lathe being exhibited by Maning, Maxwell & Moore; a Pratt & Whitney 12-in. Model B vertical shaper; an American 3-ft. sensitive drilling machine and a Newton 34-in. crank planer.

R. S. M. A. Annual Meeting

THE annual meeting of the Railway Supply Manufacturers' Association was held at noon on Saturday, President Leroy S. Wright presiding. In his opening remarks, which constituted the report of the executive committee, Mr. Wright declared the exhibit this year the greatest ever held and paid tribute to the



W. H. S. Bateman, the Newly Elected President

men whose efforts had made its preparation possible in spite of the obstacles encountered.

Secretary Conway spoke of the members who had passed away since the previous meeting, mentioning particularly the late George L. Post, a former president, George M. Basford and Daniel M. Brady. The members rose and stood for a moment in silent tribute to them.

President Wright reported the completion of the re-writing of the by-laws of the Association in accordance with the instructions of a resolution passed at the meeting in 1924. This included the change which makes the official year of the association the time that elapses between meetings, regardless of its length. Thus the two-year period since the 1924 meeting is considered one association year.

The election of the following district officers was announced: District No. 1 (New England states), Victor W. Ellet, Hunt-Spiller Manufacturing Corporation. District No. 2 (New York and New Jersey) R. J. Himmelright, American Arch Company. District No. 4 (Ohio, Indiana and Michigan), W. E. Wine, Wine Railway Appliance Company. District No. 5 (Illinois), Norman C. Naylor, Railway Steel-Spring Company. District No. 7 (states west of the Mississippi River, including Louisiana, Minnesota and Wisconsin), George L. L. Davis, Scullin Steel Company.

The following officers reported by the nominating committee were unanimously elected: President, W. H. S. Bateman, Parkesburg Iron Company and Champion Rivet Company, Philadelphia; vice-president, Gilbert E. Ryder, Locomotive Superheater Company, New York.

Following his induction into office Mr. Bateman expressed his appreciation of the honor conferred upon him. He congratulated the exhibit committee on the results of its efforts and called attention to the fact that the exhibit of railway mechanical equipment here exceeds that at the St. Louis World's Fair and Columbian Exposition in size and scope.

An invitation to all attending the meeting and conventions to visit the Sesqui-Centennial Exposition at Philadelphia, was extended personally by J. M. Thomas, business manager and comptroller of the exposition. He promised every aid to visitors in securing hotel accommodations and in seeing the features of the exposition.

Some complaint of the difficulties in securing admittance encountered by visitors to the exhibits in Machinery Hall, who are not members of the association or delegates to the conventions was voiced. President Wright promised to rectify the condition immediately and called a meeting of the Executive committee to discuss and act upon the situation.

A gold badge was presented to Mr. Wright on behalf of the association by Past President J. F. Schurch. "The



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Gilbert E. Ryder, the New Vice-President

sentiment of the association is wrapped up in this badge," said Mr. Schurch in making the presentation.

The New Officers

The newly elected president, W. H. S. Bateman, has attended every one of the mechanical conventions in Atlantic City except one; in that case he was on a business trip to the West Indies and could not get a boat which

would return him in time for the meeting. "Doc" Bateman attended his first convention as a railway supply man 30 years ago. He worked on subcommittees at the Old Point Comfort and Saratoga conventions. Incidentally, "Doc" enjoys the unique distinction of having served on the Executive Committee from the third district for eight years, under four presidents—George R. Carr, John F. Schurch, Charles W. Beaver and Leroy S. Wright—and will now continue his service on that committee two years more, as President of the association.

The Bateman family are all good boosters of the conventions. Mrs. Bateman and the two sons, Thomas Houston and Stanley Logan are real conventionites and Stanley has served on the Entertainment Committee at two conventions.

"Doc" is well known in the industrial trade, as well as in the railway supply fraternity, having served 10 years as secretary of the Associated Members of the American Boiler Manufacturers' Association. He has also served on the executive committee and as president of the Boilmakers' Supply Men's Association. He is prominent in Philadelphia affairs, having served two years as president of the Logan Improvement League, the largest community organization in that city. He is a member of the Chamber of Commerce and is a director of the Drovers' and Merchants' National Bank and a director of the Logan Bank & Trust Company. The title of "Doc" comes from the fact that he is an alumnus of the College of Pharmacy and Science. He served as first lieutenant of Company C, 4th Battalion, Philadelphia Home Defense Reserves, during the World War and as assistant chief of the Intelligence Bureau under the Philadelphia Police Department during the same period.

Mr. Bateman was born at Newfield, N. J., about 25 miles from Atlantic City, June 3, 1868. His father was Rev. Thomas M. Bateman, D.D., LL.D. "Doc" was educated in the public schools and in 1889 was graduated from the Philadelphia College of Pharmacy and Science. He entered the employ of the Lukens Iron & Steel Company, now the Lukens Steel Company in January, 1893, specializing in railroad and industrial sales. He became general traveling sales agent in 1895. In 1907 he went with the Chicago Pneumatic Tool Company to look after its southern business. In January, 1909, he became general eastern and southern sales agent of the Champion Rivet Company and district sales manager of the Parkesburg Iron Company for Western New York, Pennsylvania, Ohio and the southern states east of the Mississippi.

"Doc" has one hobby and that is "Punch and Judy" shows. Many a time he has entertained children, rich and poor, and old folks as well, in this way.

Gilbert E. Ryder, vice-president of the Superheater Company, the newly elected vice-president of the Railway Supply Manufacturers' Association, has been active in the affairs of the association for many years. During this period he has served on several committees, some of which he has also been chairman. In 1916 he was chairman of the Entertainment Committee, and he is chairman of the present Exhibit Committee, in which capacity he has had a large measure of responsibility for the success of the most extensive exhibit ever organized by the association.

Mr. Ryder's organization activities have not been confined to the affairs of the R. S. M. A. At one time he took an active part in the work of the International Railway Supplymen's Association, the organization which exhibits in connection with the convention of the International Railway Fuel Association. He has served as president of this organization. He has also taken an active interest in the civic affairs of his community, having served several years on the board of education of Leonia, N. J., part of the time as its president.

Mr. Ryder has been with the Superheater Company since 1911, at which time he entered the service department. He afterwards became the head of that department and while in this position developed and managed the company's publicity department. In 1921 he was elected vice-president, and is in charge of the entire sales department of the company.

New Equipment

THE Seaboard Air Line is inquiring for from 30 to 40 express cars. This company is also inquiring for from 10 to 12 steel dining cars and 20 coaches, as was reported in the *Railway Age* of May 29. The company contemplates buying a number of locomotives.

The New York, Westchester & Boston has ordered 10 motor passenger cars from the Pressed Steel Car Company. This is in addition to the 10 cars previously ordered from the same builder and reported in the *Railway Age* of March 20.

The New York Central contemplates buying twenty 4-6-4 type locomotives.

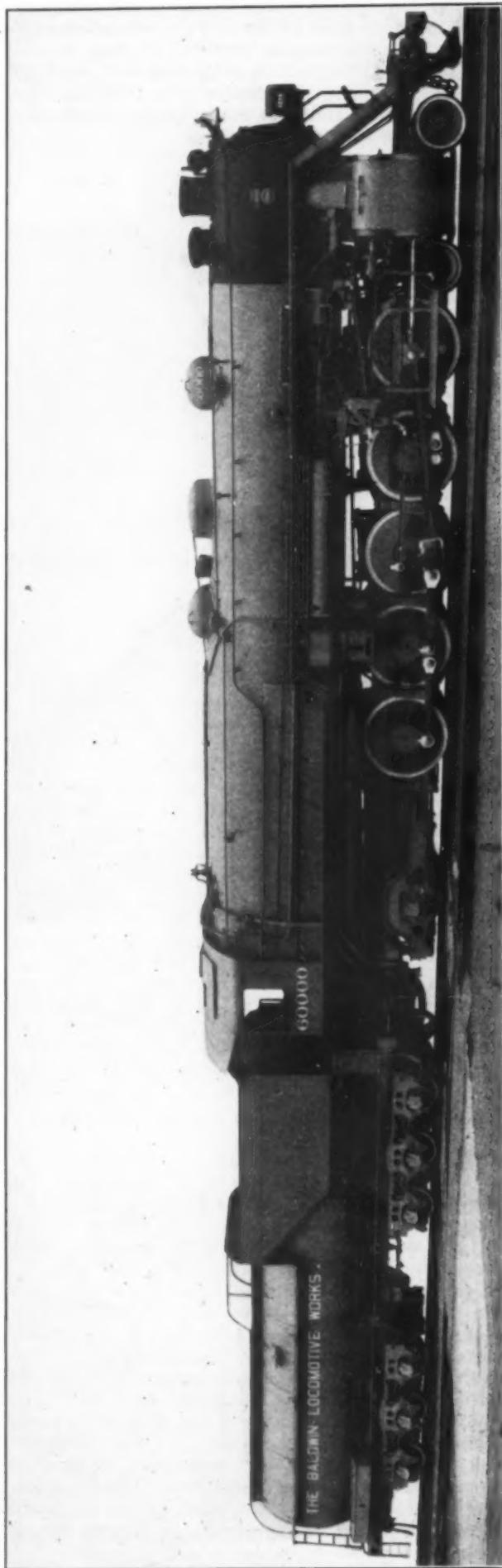
The Jacksonville Terminal expects to come into the market for some locomotives.

The Norfolk & Western will build 250 flat cars in its own shops.

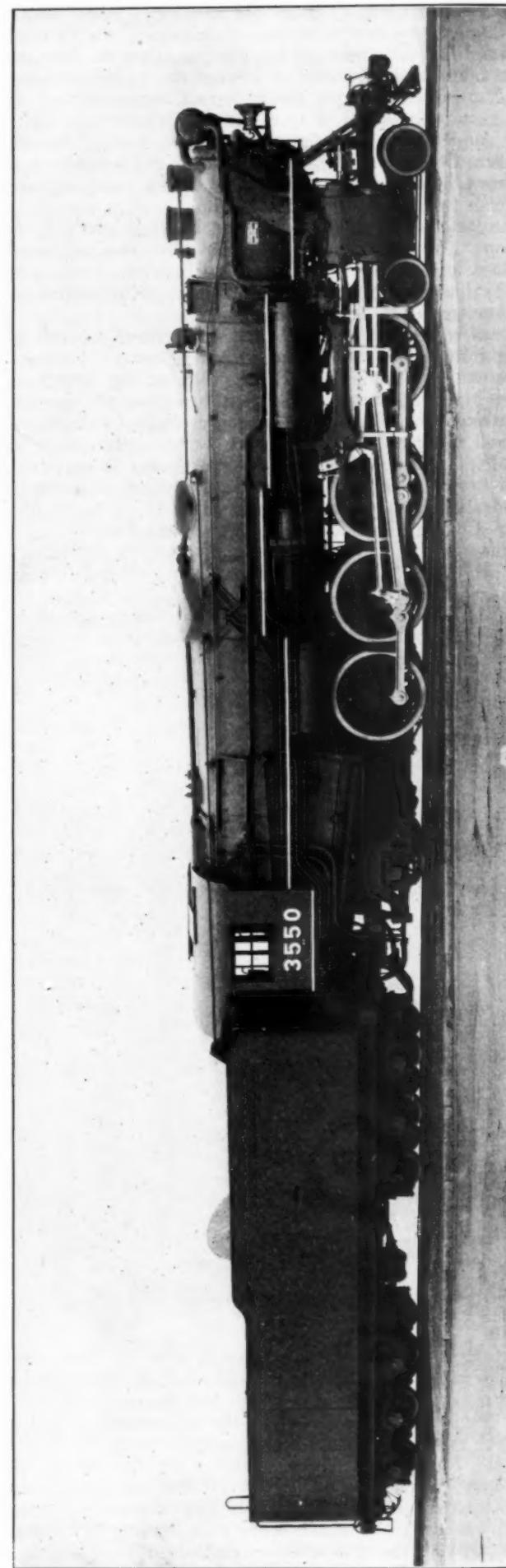
Almost a Century

WE hear a good bit in these days about plans of railroad companies for celebrating their centennial anniversaries. The epidemic is spreading, and some of the railroad supply companies are checking up their records to see just when their turn will come. Obviously the time to make a splurge of such a celebration would be during one of the years when the big conventions are being held at Atlantic City. It is something of a tragedy, therefore, that the Ulster Iron Works finds that this is the year of its ninety-ninth anniversary and that if the big conventions continue to be held only every other year, they will be barred out of celebrating their centenary at the time of the convention. In a sense, however, that company could celebrate its one hundred and first anniversary, for building operations were begun at Saugerties, Ulster County, N. Y., in the fall of 1825, under the direction of Henry Barclay who developed the water power of Esopus Creek at that point. Two years later, 1827, the Ulster Iron Company was formed by William Young and Henry Carey who operated the mill for many years with puddlers, heaters and rollers, trained by the iron masters of England and Wales.

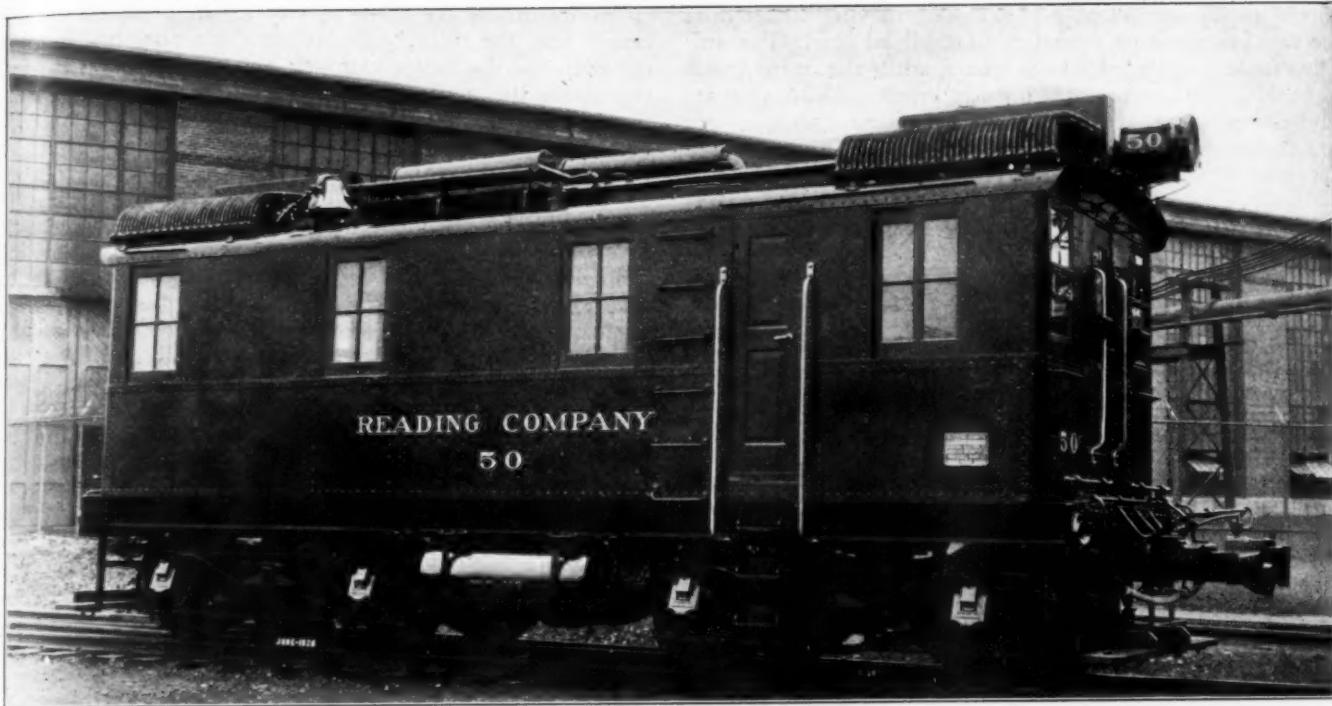
In 1863, William Mulligan and his brother, C. R. Mulligan, assumed the management of the works. At Saugerties the mill depended on the Hudson river for its transportation facilities. This limited the receipt of raw materials and shipment of product to the season of open navigation, which was a serious handicap. In 1883, C. R. Mulligan assumed the management of the Dover Iron Company of New Jersey at Dover, N. J. A year later he took over the business of the Ulster Iron Works which had outgrown the plant at Saugerties and transferred the plant to Dover where the manufacturing operations of the Ulster Iron Works have been conducted since that time. He served as president of the company until 1922, when he was elected chairman of the board. He was succeeded as president by his son, John, who served as vice-president for a number of years under his father. John Mulligan died May 5, 1926, at the age of 56 years. C. R. Mulligan, who is 89 years of age is expected to be present during part of the convention.



Baldwin High-Pressure, Three-Cylinder Compound Locomotive of the 4-10-2 Type



New York, New Haven & Hartford High-Pressure Three-Cylinder Locomotive with McClellan Type Boiler



Similar Oil-Electric Locomotives of the 60-Ton Type, Are in Use on Five Other Roads

Locomotive Exhibit Shows Development

High-pressure and Three-cylinder Locomotives of Advanced Design—Internal Combustion and Electric Locomotives Included

THE locomotives shown on the Reading and Pennsylvania railroad tracks on Mississippi and Georgia avenues, a few blocks south of the Pier, have for years been an important feature of the Atlantic City conventions. Those on view this year are impressive in that they show such marked advancement in various details of design. Two of the steam locomotives have boilers with water-tube fireboxes designed for unusually high steam pressures. The one sent by the Baldwin Locomotive Works has a boiler entirely different from any other locomotive yet built, while the engine is of the three-cylinder compound type. The one sent by the American Locomotive Company has a boiler with a McClellon firebox similar to other designs of locomotives in service on the New York, New Haven & Hartford. Four of the five steam locomotives are of the three-cylinder type—three simple and one compound. The other locomotive is a striking and very modern Pacific type locomotive built for high speed passenger service on the Reading. This is of the more conventional two-cylinder simple type.

Two oil-electric locomotives are also shown. They will attract much attention as this is the first time that locomotives of this type have been seen at Atlantic City.

Electrification is still making advances and for those interested in this type of motive power, the two electric locomotives on Mississippi avenue will be found deserving of a thorough inspection.

Baldwin Three-Cylinder Compound

This locomotive is of the 4-10-2 type with three cylinders arranged on the compound principle. The boiler has

a water-tube firebox and carries a working pressure of 350 lbs. The firebox is made up of a hollow cast steel mudring, two horizontal upper drums and one hundred 4-in. water tubes which replace the side waterlegs used in a boiler of the ordinary type. The front end of the mudring casting is connected to the boiler barrel by two circulating pipes. A 50-element superheater is installed and the throttle valve is placed in the smokebox—a shut-off valve being provided in the dome at the rear end of the dry pipe.

The shell of the boiler is 84 in. in diameter and has 206 tubes of $2\frac{1}{4}$ in. diameter and 50 flues of $5\frac{1}{2}$ in. diameter, 23 ft. long. The grate is $138\frac{1}{4}$ in. wide by 96 in. long, giving a grate area of 82.5 sq. ft. Fuel is supplied by a Duplex Stoker. The total water heating surface is 5,192 sq. ft. of which 745 sq. ft. is in the firebox, 27 sq. ft. in the firebrick tubes and 4,420 sq. ft. in the shell tubes and flues. The superheating surface measures 1,357 sq. ft.

The weight of the engine is 457,500 lb., of which 358,400 lb. is on the driving wheels, 57,500 lb. on the front truck and 61,500 lb. on the trailing truck. The driving wheel base is 22 ft. 10 in. and the total engine wheel base 45 ft. 2 in. The tender, which weighs 243,400 lb. in working order, is of the Vanderbilt type and has a capacity for 12,000 gal. of water and 16 tons of coal.

The cylinder casting is of iron and is made in one piece. The inside cylinder is the high pressure and its exhaust passes simultaneously into the two outside cylinders which are the low pressure ones. All three cylinders are 27 in. in diameter with 32 in. stroke and the piston valves are 14 in. in diameter. The high pressure cylinder is con-

nected to the second pair of $63\frac{1}{2}$ in. driving wheels and the two low pressure cylinders to the third pair. The outside cranks are placed 90 deg. apart, while the inside crank is at 135 deg. from each outside crank. With this arrangement there are four equally spaced exhausts per revolution. The locomotive is started by admitting high pressure steam direct to the outside cylinders through a manually controlled valve placed in the cab. Walschaert valve gear is applied and the inside (high pressure) valve



Front View of the New York, New Haven & Hartford Three-Cylinder Locomotive Equipment with a McClellon Boiler

is driven by an ingenious combination of the two outside motions. The rated tractive force is 82,500 lb.

The accessories are all operated by superheated steam at a reduced pressure of 250 lb., except the Worthington feedwater heater and the injector, which use saturated steam at 350 lb. pressure.

Reading Pacific Type Locomotive

The Reading Company has sent the first one of its new Pacific type locomotives designed for fast passenger service on the Atlantic City division. This locomotive was completed by the Baldwin Locomotive Works just in time for delivery before the convention opened. It weighs 306,300 lb., of which 192,500 lb. is on the drivers. The cylinders are 25 in. diameter by 28 in. stroke, the driving wheels 80 in. diameter, and the boiler pressure is 230 lb. The tractive force is 42,800 lb.

Features of this locomotive which will attract attention are the Sellers exhaust feedwater heater and injector and the Union three-speed train control apparatus. Another attachment not so commonly applied is a Westinghouse electric speed indicator.

The locomotive is attractive, clean-cut in lines. The appearance is improved by the use of du Pont Duco finish.

New York, New Haven & Hartford Three-Cylinder Locomotive

This locomotive, which is of the 4-8-2 type, is one of an order for three now being constructed by the American Locomotive Company and represents the first use of the McClellon boiler in combination with three cylinders.

The cylinders are made in two castings joined off the center line, the right hand casting containing one outside cylinder and the center cylinder, and the left hand casting containing the single left hand outside cylinder. The center cylinder is inclined at an angle in order that the middle rod may clear the front axle. The valves are driven by two Walschaert gears with the Gresley combining beam ahead of the cylinders to drive the valve for the inside cylinder. The outside cylinders are coupled to the third axle while the inside cylinder connects to the second which is made the crank. In order to avoid bending the front axle for clearance of the rod as has been previously done, the front axle has been set ahead, thereby lengthening the driving wheel base, but by the application of the Alco lateral motion to the front driving boxes, the rigid wheel base is reduced. This lateral motion is especially adapted to fit into the space on top and along the side of the middle guides inside the frames. The second and third axles are equipped with driving boxes having supplemental bearings below the horizontal center line and cellars which form spreaders at the bottom of the box. They are also arranged so that the boxes are repacked through a drop bottom in the cellar as it is impossible to open the inside ends of the cellar in the small space between the inside face of the box and the crank disc.

The steam for the right hand and the center cylinder is fed through one pipe which is equipped with a bridge to divide the steam flow to the cylinders, this bridge being deflected in a way to divert water from the middle cylinder and direct it into the outside cylinder, from which it can be more easily drained. Two oil studs are used in this pipe, located below the top of the bridge and opposite each other, thereby insuring a separate and positive oil feed to each cylinder. In order to avoid excessively long outside main rods due to the setting ahead of the front axle, the piston rods have been lengthened and the main rods thus kept at a normal length. A novel arrangement of guide yokes and link supports was used which also are worthy of note. The guide yoke for the middle guide fastens to the frames ahead of the front drivers and extends outwardly on each side to provide the front support for the outside guides, while the outside guide yoke cross-tie is located between the first and second drivers. Thus two guide yoke crossties are provided and are connected together at their outer ends by bridge members which form the link supports. To avoid excessively long eccentric rods, the links are swung in the rear of the back guide yoke, the link supports being extended accordingly. These bridge member link supports also carry the reverse shaft bearings and form the bolting means for the rear ends of the outside guides. In addition, they incorporate near their front ends the crosshead guides for the valve stems which gives a normal length of radius bar and elongates the valve rods. This construction is of great strength and rigidity to resist the augmented fore and aft thrusts of the three-cylinder valve gear.

The boilers of the McClellon type have improved features over similar boilers previously built and except for the flattened smokebox bottom are identical with the boilers for an order of similar two-cylinder engines now under construction. They are 79-5/8 in. inside diameter at the front end and 93 in. outside at the throat and are designed for a working pressure of 265 lb.

The firebox is 120 in. long by 85 in. wide with a front water space of 6 in. The combustion chamber is 68 in. long. In general, the firebox consists of the three drums at the top and a hollow cast steel firebox ring at the bottom, circular in cross-section, the drums and the firebox ring being connected by water tubes along the sides and across the back and also by a special section surrounding the firedoor opening. Water tubes are also applied in the combustion chamber. The firebox ring is a U-shaped steel

casting of tubular design 9 in. in inside diameter and is fastened to the back section of the throat sheet.

The heating surface of the tubes and flues is 3,659 sq. ft., the fire brick tubes 27 sq. ft., and firebox 431 sq. ft., making a total of 4,117 sq. ft. The superheating surface is 2,274 sq. ft. and the grate area is 70.8 sq. ft. The superheater is the Type E, having 172 units.

A Chambers smokebox throttle is used with an especially constructed smokebox, providing an arrangement whereby the steam pipes leading from the throttle to the steam chest are located entirely outside of the smokebox and in order not to obstruct the vision ahead they are let into depressions in the sides of the smokebox. The top of the smoke box is flat and on a level below the outlets of the steam pipes connecting the superheater header with the throttle, thus bringing all the steam pipes and the throttle entirely outside of the smokebox so that all joints and valve seats are easily accessible for repairs without entering the smokebox.

The main steam distribution valves are all of the piston type, double-ported for the outside cylinders and single-ported for the inside cylinder and are set for a maximum travel of 6 in. with 1-1/16 in. steam lap, 3/16 in. exhaust clearance and 1/4 in. lead.

The cylinders are 22 in. in diameter by 30 in. stroke and are fitted with gun iron bushings. The crossheads are of chrome-vanadium electric cast steel and reciprocating weights are as low as possible consistent with proper counterbalance and strength. The driving wheels are 69 in. in diameter.

The total weight of the engine is 377,000 lb. of which 253,000 lb. is on the drivers, 62,000 lb. on the engine truck and 62,000 lb. on the trailing truck. The rated tractive force is 71,000 lb.

The tender consists of a Rallo tank of 16,000 gal. water capacity and 18 tons coal capacity mounted on Commonwealth cast steel tender frames and six-wheel trucks.

The special equipment used on this engine includes, Commonwealth cast steel ashpan, bumper, engine truck, trailing truck and frame cradle; Hancock valves, water column oil cups and injectors; Ohio drifting valves; Franklin firedoor, wedges and radial buffer; American Arch Company's security brick arch with Griffin arch tube plugs; Superior soot blower; standard Type "B" stoker with engine placed on the tender; Barco reverse gear and flexible joints; Alco handrail columns; Pyle-National headlight generator; Elesco K-39-A feed water heater; Chicago flange oiler; Vapor Car Heating Company's steam heat with Leslie reducing valve; Paxton-Mitchell rod packing; Graham-White sanders; Okadee smokebox hinges; Ashcroft steam gages; Consolidated safety valves and Mears combined air drum supports and pipe brackets.

Some of the more important materials are normalized carbon-vanadium steel for the driving axles, truck axles, crank axle and outside crank pins. The crank disc and center crank pin are of straight carbon steel. Rigid staybolts are of Burden iron; flexible staybolts from Ryerson. The firebox and combustion chamber tubes are Shelby seamless steel and the boiler tubes and flues of charcoal iron. Driving box bearings, truck journal bearings and rod bushings are of Magnus metal. Franklin grease cellars. The locomotive has Hunt-Spiller gun iron cylinder and valve chest bushings and crosshead shoes. Johns-Manville sectional magnesia lagging is used.

Lehigh Valley Three-Cylinder Locomotive

Lehigh Valley locomotive No. 5000 has come back to Atlantic City for a second visit. The locomotive went into milk train service on the Lehigh Valley March 22,

1924; on June 2, 1924 it was shipped to Atlantic City and was on exhibition during the entire convention; it was received back in Sayre on June 23, went into local passenger service for a few days, and on June 28 was put back in milk train service.

This engine has been regularly assigned to milk train No. 38 east-bound, and No. 21 west-bound, making alternate trips each day with another similar three cylinder locomotive. Train No. 38, east-bound, is composed of from 19 to 25 loaded milk cars, depending upon the season, while train No. 21, west-bound, is composed of from 38 to 43 empty milk cars, also depending upon the season.

East-bound from Wilkes-Barre to Mountain Top is a long grade, five miles of which is 54.9 ft. to the mile, and 14 miles 61.5 ft. to the mile. West-bound from Lehighton to Mountain Top are 24 miles averaging 35.0 ft. to the mile and 11 miles 64.0 ft. to the mile.

Train No. 38 is operated on a severe schedule, requiring a sustained speed of from 50 to 55 m. p. h. over the entire division with the exception of the heavy grade over the mountain. Formerly this train was handled by a heavy Pacific type locomotive which was double-headed over the mountain. The three-cylinder locomotive handles this train without helper except in cases of a severe snowstorm. By May 26, 1926, when taken out of service in order to be shipped to Atlantic City, this locomotive had a mileage of 99,018.

On February 5, 1925, the engine was taken in the shop and given Class 5 repairs, being released on February 21. Again on November 10, 1925, it was taken in the shop and given Class 5 repairs being released on December 5. Since the last Class 5 repairs it has made 23,300 miles. The cost of all repairs, including the two Class 5 repairs, totals \$7,447.20. This figure includes labor, material, shop and store expense. This is approximately 7½ cents per locomotive mile.

Denver & Rio Grande Western Mountain Type Locomotive

This locomotive is one of ten built by the Baldwin Locomotive Works for heavy passenger service on what has been described as "The Scenic Line of the World." Operating conditions are unusually severe as the steepest grades are three per cent and the sharpest curves 16 deg. The aim in designing the new locomotives was to obtain maximum capacity in a coal-burning unit of the 4-8-2 type, without exceeding specified weight and clearance limits. To accomplish this it was imperative that all superfluous weight be omitted and the detail parts are consequently as light as is consistent with the strength required.

This locomotive is of the three-cylinder simple type, and with a weight limit of 288,000 lb. on driving wheels, develops a starting tractive force of 75,000 lb. This is exceptional for an eight-coupled design, giving these locomotives a hauling capacity which is exceeded by comparatively few locomotives used in freight service. The weight on the front truck is 66,000 lb. and 63,000 lb. on the trailing truck, making the total weight of the engine 417,000 lb.

The three cylinders are cast separate from each other and the center cylinder is in one piece with the saddle. The piston of the inside cylinder is connected to the second pair of drivers and those of the two outside cylinders to the third pair. All cylinders are 25 in. in diameter and 30 in. stroke. Walschaert valve gear is used, with a double return crank on the right hand side, which drives two links, one for the inside cylinder and one for the outside. Each 12-in. valve is given lead through a com-

bination lever connected to the corresponding crosshead. The three valve motions are controlled simultaneously by a power reverse mechanism.

The cylinders receive steam through two outside steam pipes, that on the right hand side having two branches leading respectively to the inside and the right-hand outside valve chambers. The outside crossheads are of the alligator type, while the inside crosshead is of the underhung type, the design being selected in order to provide sufficient clearance above the first driving axle.

The crank axle is of the built-up type in five parts; two end pieces, two crank cheeks, and the center pin. All the driving tires are flanged and lateral motion boxes are used on the first driving axle.

The driving wheels are 67 in. in diameter. The total engine wheelbase is 41 ft. 6 in., the driving wheelbase 18 ft. 3 in. and the rigid wheelbase 11 ft. 10 in.

The boiler is 92 in. in diameter and carries 210 lb. steam pressure. The firebox is 108 in. wide and 96 in. long, making the grate area 95 sq. ft. There are 244 tubes $2\frac{1}{4}$ in. in diameter and 64 flues $5\frac{1}{2}$ in. in diameter. The evaporation heating surface is 5,093 sq. ft., 402 sq. ft. being in the firebox and combustion chamber, 110 sq. ft. in the arch tubes and siphons and 4,581 sq. ft. in the tubes and flues. The superheating surface is 1,495 sq. ft.

The boiler, apart from its large dimensions, presents no unusual features of construction. It has a 5 ft. combustion chamber and tubes of moderate length—19 ft. 6 in. The boiler accessories include a superheater having 64 elements; a Worthington feedwater heater and a Standard mechanical stoker. The water level is shown by a sargent three-face water gage. The brick arch is supported on three tubes and two siphons. Barco joints are used in the connections between the engine and tender.

The tender which weighs 291,000 lb., is of interest not only because of its design but also because of its large capacity. It carries 15,000 gallons of water and 25 tons of coal. The trucks are of the six-wheeled type and the tank is rectangular in cross section.

On the design of this locomotive the builders were assisted by collaboration on the part of J. S. Pyeatt, president and W. J. O'Neill, general mechanical superintendent of the Denver & Rio Grande Western.

Oil-Electric Locomotives

Two oil-electric locomotives are shown this year, both being joint products of the American Locomotive, General Electric and Ingersoll-Rand companies. One is a new 60-ton type locomotive of 300 hp. built for the Reading, and the other a 100-ton locomotive of 600 hp. capacity which has been in service for the past four months on the Long Island.

The 100-ton locomotive is the first, and thus far the only, oil-electric locomotive of this size and design. Up to the time of its shipment to Atlantic City it had a record of 1,574 hours of service, during which time the consumption of fuel oil was 11,289 gal., and of lubricating oil 101 gal. The weight of the locomotive is 208,000 lb. It is mounted on two four-wheel trucks, each of which has a wheel base of 7 ft. 2 in., while the total wheel base is 24 ft. 2 in. The wheels are 36 in. in diameter, and the axles have $6\frac{1}{2}$ -in. by 12-in. journals.

The motive power is furnished by two Ingersoll-Rand oil engines, each having six cylinders, 10 in. by 12 in. The engines drive electric generators which furnish power to the four motors—one for each axle—of the GE-69-C type. The gearing ratio is 4.375 and the driving wheels

are of 36 in. diameter. The tractive force is 60,000 lb. at starting and 15,000 lb. at a speed of 10 m.p.h. The maximum speed is 30 m.p.h.

The 60-ton type Reading locomotive weighs 130,000 lb. and has the same truck and total wheel bases as the 100-ton locomotive. The oil engine is also the same as that on the larger locomotive, but in this case there is only one engine and the power is thus one-half as much. The four motors are of the HM-480-G type and the gear ratio is 5.86. The driving wheels are 38 in. in diameter, and the axles have 5-in. by 9-in. journals. The tractive force is 36,000 lb. at starting and 7,900 lb. at a speed of 10 m.p.h. The maximum speed is 30 m.p.h.

In the period between October 22, 1925, and May 28, 1926, oil-electric locomotives of the 60-ton type were delivered to the Central Railroad of New Jersey, the Baltimore & Ohio, the Lehigh Valley, the Chicago & North Western and the Erie.

New Type Engine Truck

At the east end of the Reading tracks on Mississippi avenue, there is a new type of four-wheel leading engine truck built by the Canadian Locomotive Company, Kingston, for the Canadian National Railways. The truck is of the outside journal type. The bearings are provided with floating bushings and grease is used as a lubricant. The truck was designed by the railroad and has a one-piece cast steel frame made by the Commonwealth Steel Company.

Bethlehem Auxiliary Locomotive

While the auxiliary locomotive mounted on a four-wheel tender truck is more or less well known to railroad mechanical men and was shown in an early form on a Delaware & Hudson locomotive at a previous Atlantic City convention, this is the first time that an auxiliary locomotive mounted on a six-wheel tender truck has been displayed. This interesting development of the Bethlehem Steel Company is shown on the platform on the West side of the boardwalk opposite the Pier.

Electric Locomotives

The motor-generator type locomotive included in the exhibit is the first one completed of the five ordered by the New York, New Haven & Hartford from the General Electric Company and the American Locomotive Company. These locomotives are designed for freight service and two others of similar design for switching service were included in the order. Alternating current power is delivered to the locomotive from the trolley at 11,000 volts and 25 cycles. A motor-generator set on the locomotive is used to convert the a. c. power to 600 volts d.c. for the traction motors. In this manner the advantages of high voltage power distribution and the desirable operating characteristics of series direct current traction motors are both included. The control apparatus is extremely simple and particularly effective.

The other of the two electric locomotives in the exhibit is a New York Central switcher just completed by the American Locomotive and General Electric Companies. It is a 600-volt d.c. locomotive designed for third rail operation. It affords some interesting opportunities for comparison as both locomotives have the same motor equipment.

The Exhibit of Self-Propelled Motor Cars

THE tremendous progress which has been made in self-propelled motor cars since the 1924 convention is apparent from even a most hasty examination of the exhibits on the Mississippi avenue tracks of the Reading. This car has now become a full grown railroad car driven by engines of ample capacity. In the larger size units the gas-electric type has proved its superiority and reliability while the gasoline-engine car with mechanical transmission has been found to be satisfactory where the demands are not too severe.

Brill Self-Propelled Cars

Two Brill-Westinghouse gas-electric cars are shown. One car is a 73-ft. unit just completed for the New York, Ontario & Western; the other is a standard Brill-Westinghouse 60-ft. unit.

Each car has a power plant consisting of a 250 horsepower gasoline engine connected on a 170 kilowatt generator, mounted in the forward end of the car, which furnishes energy to the two 600-volt traction motors mounted on the forward truck of the car. The operator's seat and equipment are at the forward right hand side of the power plant compartment. Control is arranged for double-end operation. The total seating capacity of the 73-foot unit is 92 persons, 84 of which are provided for in the main compartment. Other seating accommodations are in the baggage and smoking compartment. The smaller car seats 50 persons.

Either type of car is capable of handling a trailer. The use of the 250 hp. engine makes high speed of these cars possible over a rolling profile and gives excellent operating characteristics.

The New York, Ontario & Western car has a 10-ft. mail compartment in which all equipment used is standard and approved by the United States post office department. In addition to the mail compartment, a 10-ft. 8½-in. baggage compartment, an 11-ft. 2-in. engine compartment at the front, and a 6-ft. 5¾-in. rear platform containing an operator's cab and a saloon compartment, there are passenger and smoking compartments, 24-ft. 4½ in. and 10 ft. 2½ in., respectively, accommodating 67 seated passengers. This arrangement makes the car a general service unit for many branch and short line conditions.

A feature of interest about this car is the improved arrangement for generator and motor control, the series-parallel controller previously used having been replaced by a simple series-parallel toggle switch.

The trucks used under all sizes of the gas-electric cars are of the Brill 27 M.C.B. type.

In addition to the gas-electric cars, the J. G. Brill Company is showing a standard Model M-75-4 gasoline motor car with mechanical transmission. This car is driven by a six-cylinder Winton gasoline engine developing 190 hp. at 1,300 r.p.m., and has a gear arrangement which provides for five speeds forward and back. The seating capacity is 56 and the weight of the car is 53,000 lb. The trucks are of the Brill 82 type.

This car is accompanied by a trailer, Type T-75-4, car of a corresponding general design.

Electro-Motive Car

The Electro-Motive Company, Cleveland, Ohio, has on exhibition a Chicago, Milwaukee & St. Paul gas-electric car which is typical of large size self-propelled motor

cars furnished by the company for service on a number of roads. This particular car has a 60-ft. body with baggage, smoking and general passenger compartments. An increase in seating capacity to 52 is obtained by arranging for three passengers in the seats on one side of the aisle and two passengers in the seats on the other side. The gasoline engine is a 220-hp. Winton, Model 106A, coupled to a GE generator.

As engines ranging from 220 to 730 hp. are available, motor cars can be furnished with various sizes of bodies and with sufficient power to meet all conditions of service. A total of 50 cars are already in service and almost as many more are on order or under construction. This includes an order for five just received from the Great Northern.

Correction—P. & S. Proceedings

OUR attention has been called to an error in reporting the membership of the Committee on Memorials of Division VI—Purchases and Stores, in the issue of June 10. As corrected, this committee was comprised of A. N. Laret, assistant to vice-president and chief purchasing officer, St. Louis-San Francisco; C. K. Reasor, assistant manager of stores, Erie; and J. J. Lamneck, stationery storekeeper, Pennsylvania. The memorials of this committee were presented on Friday, preceding the adjournment of the convention.

Feet! Feet! Feet!

FEET, feet, feet, marching up and down again; there's no discharge at the convention. Sore feet, blistered feet, aching feet, but music's enchantment sets them all going at night. Weather as a topic of conversation has taken a minor place at the convention. "How are your feet?" is the popular form of greeting both on the Boardwalk and on the Pier. "My fortune for a pair of old shoes" is the way one railroad man put it. However, the first few days are hardest on the feet and many early casualties are reporting back.

Registration, American Railway Association

Division V—Mechanical

Ackley, A. W., Asst. For., D. L. & W.
 Albert, C., Boiler For., C. of N. J., Princess
 Armer, A. M., M. M., C. C. C. & St. L., Breakers
 Armstrong, Geo. W., Spec. Rep. Mech. Dept., Erie, Traymore
 Bachman, E. L., M. M., Penna.
 Balliet, H. L., Eng. Train Control, N. Y. C., Strand
 Barry, Frank J., M. M., N. Y. O. & W., Haddon Hall
 Barry, J. J., Gen. M. M., N. & W.
 Bartram, B. C., Ch. Loco. Insp., L. V., St. Charles
 Beabout, G. W., Elec. Eng., C. & O., Ambassador
 Becker, Harry G., Shop Supt., D. & H., Craig Hall
 Berg, K., Shop Supt., P. & L. E., Brighton
 Beyer, F. A., Shop. Supt., St. L. & S. F., Ritz
 Bickley, W. C., Gen. For., Penna.
 Bingaman, Chas. A., Mech. Eng., P. & R., Grand Atlantic
 Bissett, J. R., Mech. Insp., S. A. L., Haddon Hall
 Booth, James K., M. M., B. & L. E., Brighton
 Boyd, H. H., Asst. Sh. Mech. Eng., C. P. R., Haddon Hall
 Bracken, J. L., Eng. Asst., N. Y. N. H. & H.
 Brigham, Jr., E. D., Supt. Equip., No. A. Car Corp., Haddon Hall
 Brownell, B. M., Mech. Engr., Term. R. R. Asso. of St. L. Princess
 Bryant, J. G., Loco. Eng., C. of Ga., Strand
 Buck, E. R., Asst. M. M., Penna.

Budwell, Walter, M. M., N. & W., Ritz
 Bullock, Harvey L., Elec. For., N. Y. C., Stanley
 Burns, John, Works Man., C. P. R., Haddon Hall
 Caley, Geo. W., M. M., N. Y. C., Fredonia
 Cantley, Wm. I., M. E., L. V., Haddon Hall
 Carty, F. J., Mech. Eng., B. & A., Pennhurst
 Caswell, W. H., Ch. Mech. Insp., N. Y. N. H. & H., Monticello
 Chaffin, H. B., M. M., Penna., Breakers
 Cherry, W. Y., S. M. P., Penna., Chalfonte
 Chidley, Joe, S. M. P., N. Y. C., Traymore
 Clark, Wm. A., Supvr. P. & R., Chalfonte
 Clinch, R. Floyd, V. P., C. N. S. E. & M., Chalfonte
 Connely, E. K., V. P., Pullman Co., Ritz
 Cooper, F. E., Supt. of Shops, B. & O., Dennis
 Craig, W. J., Dist. Boiler Insp., B. & O., Craig Hall
 Creel, C. L., M. M., S. V., New England
 Cromwell, H. T., Asst. Supt. of Shops, B. & O., Chalfonte
 Culver, C. W., Wks. Mgr. C. of N. J., Marlborough
 Cunningham, J. L., S. M. P., Penna., Chelsea
 Daley, W. W., M. M., N. Y. O. & W., Shelburne
 Demarest, G. L., Ch. Cl. Mech Dept., C. R. R. of N. J., Princess
 Dickert, C. L., S. M. P., C. of Ga., Brighton
 Diehr, C. P., M. M., N. Y. C., Fredonia
 Dougherty, George E., M. M., D. L. & W., Chalfonte
 Duncan, Robert, M. M., A. C. L., Iroquois
 Dunham, W. E., Supt. Car. Dept., C. & N. W., Ritz
 Edmondson, O. N., Gen. For., Penna., Seaside
 Endicott, G. F., Mech. Eng., N. P., Marlborough
 Ennis, J. B., V. P., Amer. Loco. Works, Traymore
 Eves, R. W., Dist. Elec. supr., B. & O., Craig Hall
 Feeley, M., M. M., D. L. & W., Strand
 Flynn, W. H., S. M. P., N. Y. C., Marlborough
 Freeman, Samuel, Asst. R. F. E., Penna., Devonshire
 Galloway, A. K., Dist. M. M., B. & O., Haddon Hall
 Galloway, C. W., V. P., B. & O., Shelburne
 Galloway, G. R., Gen. M. M., B. & O., Haddon Hall
 Geib, F. A., Gen. For., Penna., Iroquois
 Gorman, E. R., S. M. P. & M., C. St. P. M. & O., Marlborough
 Hankins, F. W., G. S. M. P., Penna., Dennis
 Harris, Charles M., V. P., H. & F., Dennis
 Hedley, Frank, Pres. Inter. Rap. Trans., Ambassador
 Heffron, Thos., Gen. For., D. L. & W., Grand Atlantic
 Hines, F. D., Mech. Asst. to Gen. Supt., P. & R.
 Hines, J. P., M. M., B. & O., Dennis
 Hobbs, F. S., Gen. Mgr., N. E. Tr. Co., Ambassador
 Hodges, A. H., Dist. M. M., B. & O., Byron
 Huston, F. T., M. M., Penna., Shelburne
 Hyland, Chas., Mech. Supt., T. T., Chalfonte
 Jackson, W., Mech. Supt., Erie, Haddon Hall
 Jefferson, M., M. M., L. V., Princess
 Jeffrey, Thos., Gen. Insp., M. P., D. L. & W., Raleigh
 Jennings, J. F., S. M. P., M. C., Ritz
 Jumper, F. J., Spec. Eng., U. P., Ambassador
 Junker, H. A., Gen. For., D. L. & W., Haddon Hall
 Keiser, E. B., S. M. P., Penna., Haddon Hall
 Kelly, W. M., Gen. For., Penna., Pen Alto
 Kimbel, Harry C., Supvr. of Mach. & App., C. of N. J., Sterling
 Knott, F. W., Shop Supt., S. A. L., Brighton
 Kocher, R. D., Gen. For., D. L. & W., Ambassador
 Koschinake, E. A., Supt. of Shops, D. L. & W., Ambassador
 Laux, J. P., Shop Supt., L. V., Traymore
 Leibau, Carl, Gen. For., Wab., Ambassador
 Leverage, John R., Asst. Supt. Shops, A. T. & S. F., Princess
 Lumberg, Elmer, Ch. Elec., C. of N. J., Strand
 McAllister, J., Supvr. Shop Mach. & Tools, N. Y. C., Traymore
 McAmes, W. H., M. M., Mo. Pac., Breakers
 McGahey, R. E., M. M., R. F. & P., Strand
 McGafferty, W. G., M. M., C. of Ga., Strand
 McGann, C. E., Div. M. M., B. & O., Haddon Hall
 Maginn, J. J., M. M., N. Y. C. & S. L., Marlborough
 Manderson, A. R., Gen. Insp. D. L. & W., Strand
 Mansfield, J. J., Ch. Boiler Insp., C. of N. J., Princess
 Martin, J. J., Eng. Ho. For., C. of N. J., Princess
 Michael, J. B., M. M., Sou., Princess
 Miller, J. R., Ch. Clk., B. & O., Lexington
 Meade, P. J., M. M., A. C. L., Chalfonte
 Moore, John F. C., For., P. & R., Traymore
 Muir, R. Y., M. C. B., P. & W. V., Princess
 Mullen, N. V., M. M., M. & P., Dennis
 Murray, F. H., M. M., Erie, Arlington
 Newman, C. M., Supvr. of Shops, B. & O., Marlborough
 Noble, H. S., M. M., Penna., Chalfonte
 Orr, John J., For. D. L. & W., Craig Hall
 Painter, J. H., M. M., A. C. L., Chalfonte
 Parker, H. H., M. M., N. & P. B. L., New England
 Parsons, F. G., Supt. Shops, N. Y. C., Chalfonte
 Patton, C. S., S. M. P., S. A. L., Haddon Hall
 Perrine, W. M., M. M., C. of N. J., Dennis
 Phillips, A. G., Supvr. Shop Mach. & Tools, D. L. & W., Ambassador
 Quinn, J. H., Gen. For., Penna., Brighton
 Raymond, A. A., M. M., N. Y. C., Shelburne
 Rhoads, G. A., M. M., Penna., Brighton
 Rhuark, F. W., M. M., Wab., Pennhurst
 Ringberg, E. G., Mech. Eng., Me. Cen., Dennis
 Robinson, W. L., Supt. Fuel & Loco., B. & O., Marlborough
 Sasser, J. W., S. M. P., Virginian, Traymore
 Seddon, E. F., Gen. Mach. For., L. V., Traymore
 Sheedy, J. R., M. M., Penna., St. Charles
 Silverman, Mortimer, Asst. to Ch. of E. C., B. & M., Dennis
 Smith, C. B., Asst. to Mech. Supt., B. & M., Shelburne
 Smith, W. T., Retired S. M. P., C. & O., Lexington
 Smock, F. A., Gen. For., Penna.
 Staples, J. W., Genl. Amer. Tank Car Corp., Shelburne
 Stradley, William H., Shop For., P. & R., Traymore
 Stubbs, C. M., Gen. For., Erie, Haddon Hall
 Surplus, Hugh, Gen. For., D. L. & W., Ambassador
 Sweetman, E. M., S. M. P., So., Traymore

Tapman, W. H., Genl. Mech. Insp., B. & O., Arlington
 Trotter, C. E., Supvr. Loco. & Fuel, N. Y. C. & St. L., Breakers
 Tuttle, C. L., Mech. Eng., B. & L. E., Brighton
 Usherwood, G. B., Supvr. Boilers, N. Y. C., Haddon Hall
 Vander Bogart, J., Gen. For. Elec. Div., N. Y. C., Traymore
 Voigt, A. E., Car. Lgt. Eng., A. T. & S. F., Traymore
 Webster, H. D., Eng. of M. P., B. & L. E., Haddon Hall
 Whetstone, H. E., Asst. M. M., B. & O., Seabrook
 Wiberg, R. L., Asst. G. E., B. & E., Pennhurst
 Wilson, G. T., N. Y. C.
 Whyte, Arthur, Asst. Mem., Rowe Mfg. Co., Marlborough

Division VI—Purchases and Stores

Collins, W. R., Mgr. Purchases, Erie
 Johnston, J. M., Fuel Agt., K. & T., Dennis
 King, R. E., Asst. P. A., D. L. & W., Ritz
 Lembach, John Ch. Clk., (Pub. Dept.), F. E. C., Haddon Hall
 Ryan, Arthur J., Secy. to Mgr. P. & S., N. Y. C., Marlborough
 Ryan, Daniel, For. Div. Store., P. & R.
 Skinner, L. H., Pur. Agt., Sou., Ritz
 Stoner, W. G., Ch. Cl. Pur. Dept., Penna.

Special Guests

Adams, D. F., Scale Insp., Penna.
 Aiken, K. F., Cl. to V. P., S. A. L., Marlborough
 Anderson, O., For. N. Y. N. H. & H., New England
 Anthony, T. C., For. P. & R., Ritz
 Bachtel, A. P., Asst. For., Penna., Y. M. C. A.
 Bakley, W. G., Machinist, P. & R.
 Ball, J. F., Asst. Ch. Stat., B. & O., Craig Hall
 Bartlett, T. Z., Air Brake Insp., P. & R.
 Barton, E. O., For. Mach. Shop, Penna., Elberon
 Beam, T. R., For., Penna.
 Becker, R. Condit, Craig Hall
 Beirne, G., For., C. R. R. of N. J., Terminal
 Bender, Fred W., Sig. Eng., C. of N. J., Strand
 Beyler, Thomas F., Clerk, P. & R., Somerset
 Billig, V. M., Layer Out, P. & R.
 Black, J. L., Mach. App., C. of N. J.
 Blair, C. C., For. Elec., L. I.
 Boice, G. A.
 Booth, R. Sinclair, Insp. of Loco., I. C. C., Knickerbocker
 Borer, Frank J., For. Car Dept., C. of N. J., Lyric
 Brand, F. L., For., Penna., Schlitz
 Brooks, Chas. P., R. F. E., B. & M., Shelburne
 Butler, John T., For., D. L. & W., Palm Hall
 Butt, F. W., Asst. Eng., N. Y. C., Runnymede
 Cagle, G. N., Gen. For., C. of Ga., Strand
 Camp, Wm. S., Asst. Secy., So., Marlborough
 Carr, R. K., Chief Clerk, N. & W., Marlborough
 Carroll, Jos. B., For., D. L. & W., Osborne
 Cizek, M. Frank, Supt., D. L. & W.
 Cizek, R. L., D. L. & W., Knickerbocker
 Claar, Chas. N., Asst. R. F. E., P. & R., Shelburne
 Claudius, R. H., Draft., N. Y. C., Flanders
 Clinger, D., Gen'l. Amer. Tank Car Co., Plaza
 Coleman, G. H., Insp., I. C. C., Haddon Hall
 Cooper, H. M., Insp. Off. S. M. P., Penna.
 Cooper, W. H., Cl. Pur. Dept., C. of N. J.
 Cratzer, C. A., Pass. Rep., Penna.
 Delaney, John T., Com. Engr., Penna., Penn-Alto
 Dell, Frederick C. P., Dir. of Exhibits, A. R. A. Assn.
 Demarst, E. P., Iroquois
 De Remer, R. N., For., D. L. & W., New England
 Devenney, William A., Asst. R. F. of Eng., Penna., Penn-Alto
 Dickey, D. R., Elec. Repair Man, L. I., Elberon
 Dippre, P. W., Pat. For., D. L. & W., Palm Hall
 Domrus, Ernest, Asst. For., D. L. & W., Haddon Hall
 Donoso, E. G., P. A., Chilean State Rys., Strand
 Dryzer, Frank M., Asso. Exam., U. S. Patent Office
 Duffy, J. J., Elec. Insp., L. I.
 Duncan, Geo.
 Dunne, W. J., Res. Matl. Insp., N. Y. N. H. & H., Traymore
 Edwards, H. F., R. F. E., Monongahela, Raleigh
 Edwards, M. R., Elec., Penna.
 Epright, A. W., Supvr. Scales, Penna., Craig Hall
 Epright, Reeve, Craig Hall
 Ebert, F. L., Machinist, P. & R.
 Faris, C. H., Draft., N. & W., Craig Hall

Farley, L. M., For. Bat. Plant., Wash. Term., Elwood
 Feeney, Chas., For., D. L. & W., Ambassador
 Fenny, Chas., Master Black Smith, D. L. & W., Ambassador
 Fisher, C. D., Trav. Insp., Penna., Royal Palace
 Fitch, B. F., Pres., Motor Terminals Co., Traymore
 Fitzgerald, D. W., Gang For., Penna., Schlitz
 Fitzgerald, Thos., Boiler Maker, B. & O., Traymore
 Gilfillan, R. V., Metal. Insp. Eng. Tests, So., Devonshire
 Gill, John, Carpenter For., D. L. & W.
 Glasgow, R. J., For. Eng. Ho., Penna.
 Glason, Jos. P., Asst. For., L. I., Elberon
 Goodwin, J., Cl., C. of N. J., Princess
 Goodman, C. W., Machinist, Penna., Hyman
 Gopp, John, For., D. L. & W., Palm Hall
 Gould, F. E., Asst. Eng., N. Y. C., Ambassador
 Grant, Ronald, D. L. & W., Osborne
 Grant, William, For., D. L. & W., Osborne
 Greame, E. A., Tool Room For., D. L. & W., Ambassador
 Greaves, Edric C., Secy. Dist. M. M., B. & O.
 Graves, J. R., Asst. Eng., N. Y. C., Dunlop
 Grieme, Edw. G., Erect. For., D. L. & W., Osborne
 Gullage, J., Genl. For. Car Shops, B. & M., Dennis
 Harris, Robert H., Asst. Ch. Clk., D. L. & W.
 Harrison, J. J., Genl. Scale Insp., Penna., Craig Hall
 Haubennestel, Jr., John, Elec., Eng., N. Y. C., Craig Hall
 Heal, W. G., Penna., Byron
 Heald, W. E., Supt. Const., B. & O., Knickerbocker
 Heck, F., Tool Room For., C. of N. J.
 Heidelsbaugh, George F., Asst. Tr. Mas., W. J. & S. S.
 Herring, W. M., Ch. Cl. Mech. Dept., So., Traymore
 Herschede, A., Brighton
 Hesser, R. M., Supvr. Small Tools, B. & O., Craig Hall
 Hewitt, E. F., For., Penna.
 Hoffelt, F. J., Erect. Gang For., St. L. & S. F., Ritz
 Hogan, James E., Ch. Cl. Shop Supt., B. & O., DeVille
 Holland, R. N., For., L. V., Craig Hall
 Holland, Thomas, For., L. V., Craig Hall
 Hughes, H., For., C. of N. J.
 Hukill, W. S., Ch. Draft., Penna., Shelburne
 Hummel, Albert M., Machinist, P. & R., Somerset
 Jones, N. W., Asst. Supt., P. & R.
 Jones, H. R., For. D. L. & W., New England
 Kelly, Robt. G., Penna., Penn-Alto
 Kleinspehn, Arthur, Asst. For., P. & R., Leeds St.
 Kane, D. J., Asst. Ch. Draft., N. Y. N. H. & H., Stephenson
 Kerchner, F., Machinist, Penna., Y. M. C. A.
 Kershner, J. P., For., Penna.
 Kline, A. W., For. Mach. Shop., New England
 Knocke, H. M., Asst. For., Penna.
 Knuth, Martin, Car For., D. L. & W.
 Lacey, P. T., Supt. Bolt & Forge, B. & O., Velia
 Lamb, Wm. N., For., Penna.
 Lee, John, Ch. Draft., C. P. R., Ritz
 Leeds, Henry, Ambassador
 Leas, Z. J., Asst. For., P. & R., Newfield
 Lublond, R. W., Draftsman, N. Y. C., Ambassador
 Luers, H. L., Draft., B. & O., Louvan
 Madara, W. C., Penna.
 Malley, J. P., Genl. Boiler Insp., St. L. S. F.
 Malley, William R., M. K. & T., Ritz Carlton
 Marco, J., Mech. Eng., Chilean State Rys.
 Matheson, John, Insp., I. C. C., Knickerbocker
 Maylock, Edward A., Insp. M. P. Dept., P. & R., Shelburne
 McQueen, James, Asst. For., D. L. & W., Iroquois
 Miller, E. G., For., P. & R., Thompson
 Miller, G. L., Shop Draft., B. & O., Louvan
 Mills, J. S., For., L. T., Devonshire
 Mulcahy, John D., Asst. For., D. L. & W., Haddon Hall
 Murphy, H. J., For., L. I., Elberon
 Naylor, R. H., Boiler Insp., P. & R., Pacific
 O'Brien, Dennis, Asst. For., L. I.
 O'Brien, F. K., Eng. Ho. For., Penna., Marlborough
 O'Connor, Allen J., Draftsman, N. Y. C., Chalfonte
 O'Malley, P. J., Boiler For., D. L. & W., Osborne
 Oettle, G. S., Res. Rep., So. African Ry & Har., Marlborough
 Pack, Jr., A. G., Headlight Supvr., B. & O.
 Paterson, C. R., For. Insp., N. Y. C.
 Parr, Garner, C. N. Chalfonte
 Peters, R. F., Mech. Engr., S. L. S. F.
 Perot, C. P., Motive Insp., Penna.
 Persun, C. A., Scale Insp., W. J. & S.
 Petersen, G. T., Summit
 Petersen, H. H., Toolmaker, P. & R., Summit
 Phillips, E. J., Counsel, N. Y. N. H. & H., Marlborough
 Phillips, Wm. E., Erect. For., D. L. & W., Craig Hall
 Proud, N. S., Asst. For., Penna.
 Ramsey, C., Machinist, C. of N. J.

Redmond, Aiden J., For. M. P. Dept., L. I., Osburne
 Rehm, Christian, For., Penna.
 Replogle, D. G., Insp. M. P. D., Penna.
 Riddle, C. E., Spec. Pass. Car Insp., B. & O., Devonshire
 Richards, Edward
 Riley, John W., For. Blacksmith, L. V., Ritz
 Rink, Robert W., Dennis
 Rockenbauer, Otto, Gang Leader, Penna.
 Roberts, G. S., Gang For., Haddon Hall
 Rogers, John F., Asst. Gen. Mgr., Phila. Rap. Tran., Dennis
 Ryan, E. J., For., B. & O., Monticello
 Sawyer, Edgar W., Elec., P. & R.
 Schafer, N. L., Div. Eng., P. & R.
 Scheifele, Jr., John, Rd. For. Eng., P. & R., Dennis
 Schlaupitz, H., Ch. Cl. M. P. Depot., C. of N. J.
 Schlordt, W. J., Eng., Ill Cent., Princess
 Schnepe, J. H., Flanders
 Schutt, Jesse J., Asst. For. N. Y. C., Lourain
 Schwendeman, Wm., St. Book Insp., Penna.
 Sealey, Garrett L., Elec. Eng., P. & R., Knickerbocker
 Shaeffer, R. E., Secy to Gen. Supt., B. & O., Princess
 Shelson, Sr., R. C., Car. For., D. L. & W., Osborne
 Shelton, R. M., Draft., Penna., Iroquois
 Shepard, H. D., D. L. & W., Knickerbocker
 Shirley, John A., Asst. Ch. Insp. of Loco., I. C. C., Knickerbocker
 Shull, C. O., G. F., Penna.
 Simpson, W. I., Penna., Apollo
 Sims, Clifford S., Pres., H. R. Nav. Corp., Marlborough
 Smith, A. M., Sig. Supt., Erie, De Ville
 Smith, Don Y., Trav. Frtg. Agt., P. & R.
 Smith, H. H., Asst. Trav. Mgr., Elwood Anderson & Lapells, Runnymede
 Smith, Newbern, P. A., Penna., Chelsea
 Snyder, G. W., Asst. Ch. Eng., Penna.
 Southard, S. S., Asst. R. F. E., Penna.
 Spaide, George S. W., For., P. & R.
 Spott, Matt, Asst. For., D. L. & W., Palm Hall
 Stanko, E., Asst. For., C. of N. J., Craig Hall
 Stanko, Walter, Craig Hall
 Stanley, O. G., Asst. For., B. & O., Apollo
 Stenger, Andrew, Gang For. Ret., Penna.
 Stier, J. E., Draft., B. & O., Louvan
 Stoner, Albert L., Asst. F. M. N., P. & R.
 Stout, W. J., Machinist, P. & R.
 Stout, W. M., Boiler Insp., P. & R.
 Stratton, G. E., Insp., Penna.
 Stuckel, J. F., Fdry. For., D. L. & W., Dev.shire
 Stull, H. W., For., P. & R.
 Sweely, E. A., Mech. Supt., Fruit Growers Dis., Chalfonte
 Taylor, C. P., Elec. Eng., N. & W., Ritz
 Taylor, Edw., Princess
 Taylor, Wm., Princess
 Thomas, John A., Asst. For., P. & R.
 Thomas, R. A., Asst. For., B. & O., New Brighton
 Thomas, W. G., For., D. L. & W., Iroquois
 Thompson James F., Asst. Gen. For., D. L. & W.
 Tollinger, Barton K., M. P. Insp., Penna.
 Tonnes, F. W., Asst. Eng., N. Y. C., Traymore
 Tresh, Elvin J.
 Turpin, L., Air Brake Insp., P. & R.
 Voigt, Jr., J. J., Cl., Penna., Traymore
 Walker, S., Asst. Genl. For., Penna., Craig Hall
 Weber, L., For. Wheel Dept., C. of N. J., Craig Hall
 Weightman, W. B., Eng. Spec. Duty A. B., Penna.
 Weiss, O. R., Asst. For., Penna., Osborne
 Wellman, H. C., Ch. Cl., N. Y. C., Flanders
 Whalen, J. F., For., L. I., Elberon
 Whalen, M. W., Asst. For., B. & O., New Brighton
 White, Frank B., For., Penna.
 Whiteman, R. C., Insp., B. & O.
 Wigney, H. M., Ambassador
 Wilby, E., Headlight Insp., C. of N. J.
 Wiles, G. F., Dist. M. P. Insp., B. & O., Haddon Hall
 Williams G. W., Asst. Tr. Mast., A. C.
 Wilson, C. L., Insp., I. C. C., Knickerbocker
 Wilson, T. B., Supvr. Trans., So. Pac., Ambassador
 Wilson, W. H., Draftsman, B. & O., Louvan
 Wolfard, George, For., C. C. C. & St. L., Big 4
 Woodrow, H. G., St. Book Insp., Penna.
 Woodrow, H. H., Asst. Supt. R. S. & Shops, P. R. T., Traymore
 Woodward, F. S., Asst. Eng., N. Y. C., Brighton
 Wrenshall, Jr., John C., Engr. Maint. of Way, P. & R.
 Yearsley, Chas. M., For. Carpenter, P. & R.
 Yost, R. C., For. Tool Room, Penna.
 Young, Wm. J., R. F. E., B. & M., Shelburne
 Zimmerman, Harry R., For. M. P. & R. E., P. & R., Stanley
 Zimmerman, H. C., Ord. Eng., U. S. A., Majestic
 Zonkin, G. H., Asst. For., C. of N. J.
 Zuzy, G. J., Designer, N. Y. C., Dunlop

Conventionalities

R. W. Prekschat, who was formerly connected with the Pullman Company for several years in the purchasing department, and later with the Guilford S. Wood Company, has become connected as sales representative with Midgely & Borrowdale and is attending his first railroad convention at Atlantic City.

Another couple well known at the conventions who recently have had a wedding in their family are Mr. and Mrs. B. A. Clements. Their son, Robert, who has in past years attended the conventions with them, was married to Miss Leona Angly at Palestine, Texas, on April 27. The young couple have taken up their residence in Chicago, where Robert Clements is in business.

John F. Schurch comes to the conventions this year as president of Manning, Maxwell & Moore. He was elected to this position just about a year ago, succeeding J. M. Davis when the latter became president of the Delaware, Lackawanna & Western. He is accompanied by Mrs. Schurch, who is attending the convention for the second time.

It has been suggested that others besides the official stenographers are interested in the identity of Mechanical Division members who take the floor in Convention Hall to discuss the reports. Instead of confiding their names and road connections confidentially to the reporters, as is done in some cases, it would be far better to broadcast them in as stentorian tones as possible, or have the chairman announce who the speakers are.

N. D. Ballantine, assistant to the president of the Seaboard Air Line, who is also vice-president of the National Association of Owners of Railroad Securities, is attending the conventions. Mr. Ballantine was formerly superintendent of transportation of the Rock Island and later superintendent of transportation of the Union Pacific, and has been for years an advanced student of the problem of increasing freight car efficiency.

Harry Burrhus of the Registration Committee, arrived at Atlantic City a day late because of the condition of his father, Charles Burrhus, following a serious operation which he underwent at Scranton, Pa., Saturday. Mr. Burrhus says that although his father is 82 years old, he withstood the operation well and is already impatient to be back on his job as carpenter foreman of the Erie at Susquehanna, Pa.

Interstate Commerce Commissioner Frank McManamy and Mrs. McManamy have come over from Washington for the conventions. Mr. McManamy for years has been an interested and welcome visitor here. He first began to come when he was assistant inspector of locomotive boilers of the commission, and has continued to come as chief locomotive inspector, then as assistant director of operation of the Railroad Administration, and finally as a member of the Commission.

Put to the acid test, Alex Turner established himself on the 18th green at Seaview on Thursday as one of the great pinchhitters of the game of golf. Horace Parker and Burton Mudge, Sr., can testify that Mr. Turner does not need a good partner to win a foursome match, provided his partner is bad enough to make him really play his best. His last putt on Thursday puts him in a rank with Walter Hagen for cool precision at a crucial moment.

When you meet Otto Hilderbrandt be discreet. He is no longer connected with the U. S. Light & Heat Corporation, but is again with the Edison Storage Battery Company with headquarters at Norfolk, Va.

E. Wanamaker, electrical engineer of the Rock Island and a familiar figure at the conventions, is here this year with additional responsibility. He is now president of the Association of Railway Electrical Engineers and will preside at the meeting of that association to be held at the Hotel Dennis this morning.

The Hunt-Spiller boys are wearing this year the handsome brown and white convention suits they have worn at the conventions for the last ten years. Friends of John G. Platt, vice-president, are glad to see him looking so well after the severe attack of pneumonia he had about a year ago.

J. A. Andreucetti, assistant electrical engineer, Chicago & North Western, and secretary-treasurer, Association of Railway Electrical Engineers, is obliged to miss the convention this year because of illness. This is the first time he has missed a meeting of the A. R. E. E. since that association was organized in 1908. Mr. Andreucetti is now convalescent, but is still under doctor's orders.

Asher Smith, representative of the Cleveland Twist Drill Company, at Sydney, Australia, recently arrived in the United States on the ship Sierra, via San Francisco. Mr. Smith has been the Australian representative for 27 years and this is the first time that he has been privileged to attend the convention. The railroads, the physical conditions of which are good, buy many American made machine tools. They are also making rapid progress in standardizing the track gage. Mr. Smith is planning to return via Europe in order to visit his home in Scotland.

Professor Louis Endsley, of the University of Pittsburgh, is not only a regular attendant at the convention, but is always here for the opening session and remains to the end. The professor and Mrs. Endsley, who is with him, spent the months of February and March visiting Kingston, Jamacia, Panama and Columbia. While in Columbia, he enjoyed the novel experience of riding on a passenger train not equipped with air brakes. The train was stopped by hand brakes on the locomotive.

Friends of Col. F. H. Coolidge, who has attended the conventions for the past 30 years, were sadly distressed a few weeks ago to learn of his death. It was quite unexpected for the Colonel had made all plans to attend the conventions and had been looking forward with much pleasure to the occasion. Colonel Coolidge was sales agent of the American Brake Shoe & Foundry Company, with headquarters at Atlanta, Ga. He was born in Syracuse, N. Y., 71 years ago and started his railroad career on the Delaware, Lackawanna & Western. Later he followed James Buchanan to the New York Central. The Colonel was one of the draftsmen who worked on the design of the famous New York Central 999.

W. O. Thompson, secretary of the Traveling Engineers Association, is among the convention visitors. J. N. Clark, of the Southern Pacific, who is president of the association, and Mr. Thompson are developing a feature for its program this year which will be of widespread interest. This will be a series of addresses by leaders in both the locomotive building and railroad fields regarding the design, maintenance and utilization of locomotives. The acceptances that have already been received in response to the invitations extended to important men to make addresses are such as to indicate that this discussion of the locomotive from all points of view will be of very great value.

Ralph Cline of the Baltimore & Ohio, is attending the conventions this year in a new capacity. He was recently promoted to the position of master mechanic, with headquarters at Grafton, W. Va.

Among the representatives of South American railways who are listening with much interest to the reading and discussion of Mechanical Division reports at this year's convention is J. Marco, mechanical engineer of the Chilean State Railways.

L. A. Richardson, general superintendent of motive power of the Chicago, Rock Island & Pacific, with headquarters at Chicago, came east on the Manhattan Limited, arriving at Atlantic City Friday noon; he plans to remain for the balance of the convention. He was prevented from attending the opening sessions by the necessity of making an inspection trip to the Rock Island shops at Silvis, Ill., and other points on the system. Mr. Richardson is not known to have any hobby but hard work. He was promoted to his present position from that of superintendent of motive power of the Rock Island at Des Moines, Iowa, succeeding W. J. Tollerton who died last March. Mr. Richardson is accompanied by his wife and daughter, Mary.

George Isbester who used to be a regular attendant at the mechanical conventions, but who has not been with us for a number of years because of his interest in track equipment and devices arrived Friday and will remain over until the end of the meeting. When he entered service in 1917 as a commander in the navy and was assigned to Admiral Simms' staff in London, he was vice-president of the National Railway Appliances Association, which puts on the big exhibition at the Coliseum during the annual meeting of the American Railway Engineering Association. He was, of course, inactive in the Appliances Association while in service, but upon returning to civilian duties was elected for a term as president of that association. He is now engaged in the railway and industrial supply business with headquarters at Chicago and may be found at the exhibit booth of the Elwell-Parker Electric Company.

If there are any ladies in attendance at the convention who want to get ideas about the organization and successful promotion of Women's Auxiliaries, be sure to look up Mrs. Thomas Holland, president of the Ladies' Auxiliary of the Maintenance of Equipment and Athletic Associations on the Lehigh Valley at Sayre, Pa. The shop crafts employees on the Lehigh Valley are working under an employee representation system. Their organization is known as the Association of Maintenance of Equipment Employees and allied with it is the Shop Crafts Athletic Association. The Ladies' Auxiliary at Sayre is associated with these two organizations and has been functioning under the very able leadership of Mrs. Holland. The associations have a large assembly hall in the very center of the shop plant, which from a social standpoint has developed into quite a community center, as well as being the headquarters of the activities of the employees. The Ladies' Auxiliary has not only looked after the decoration and upkeep of this building, but maintains a very successful cafeteria which is used by the shop employees during the noon hour. Under the direction of the employees, educational and inspirational talks are given in the cafeteria during the lunch hour. An enthusiastic spirit of co-operation and teamwork exists at Sayre for which not a little credit must be given to the Ladies' Auxiliary. Incidentally, Mrs. Holland is accompanied by Mr. Holland, who has taken a most prominent part in the organization and upbuilding of the two organizations with which the Ladies' Auxiliary is associated.

It is a long walk from Pocatello, Idaho, to Atlantic City, but it didn't phase A. C. Hinckley, superintendent motive power and machinery of the Oregon Short Line, because he came by train. Mr. Hinckley has been in attendance at all sessions of the Mechanical Division and, as far as we can learn, hasn't missed an exhibit.

A new Pennsylvania arrival Friday was Carter Cole, recently promoted from motive power inspector to assistant road foreman of engines at Harrisburg. He says that during the recent Shrine convention held at Philadelphia, sixteen special trains were passed through Harrisburg terminal within a period of three hours, without a detention. It is reported that Mr. Cole is about to become a benedict.

George E. Seeley, recently promoted to the position of assistant master car builder of the Lackawanna, at Hoboken, N. J., reports that the car equipment of his road is in splendid condition. They have been making marked progress in combating the hot box problem by requiring periodic inspection of all boxes on both passenger and freight cars. Some months an average of over 1,000,000 miles per passenger car hot box has been obtained.

Many of the friends of R. W. Salisbury, mechanical engineer of the Texas & Pacific of Dallas, Tex., have missed him since his first appearance on the Pier Wednesday. Unfortunately, an attack of rheumatism has confined Mr. Salisbury to his room for the past two days, but under the efficient administrations of Mrs. Salisbury, we learn that he will probably be able to put in appearance today. At least his friends are hoping to greet him on the Boardwalk in a wheel chair should he not have recovered sufficiently to walk.

Among the superintendents of motive power who have been giving special attention to personnel matters is C. J. Scudder of the Delaware, Lackawanna & Western. One phase of this question which has been stressed on the Lackawanna is the effort to improve the quality of supervision by carefully worked out plans, including supervisors' clubs. The mechanical department of the Lackawanna is one of the few railroads which have a special publication devoted to the interests of the supervisors and men in that department. It is known as "The Lackawanna Supervisor," and is published monthly.

W. O. Forman, mechanical superintendent of the Boston & Maine, is most enthusiastic over the Foremen's Educational Clubs which are now functioning at the eight points on that road. A careful check indicates that within a very short time after any particular subject is taken up and discussed by the clubs, a distinct improvement can be seen in the efficiency and economy in that particular line of endeavor. The clubs have also done much to promote friendship and good feeling among the foremen and supervisors. The effect of this upon the morale and spirit of teamwork can readily be appreciated.

Saturday might well be called "Exhibitors' Day." We noticed a group of railway men in front of our booth and upon inquiry found it was the Rock Island delegation waiting to complete their party for a tour of the exhibits. Among those in the group were L. A. Richardson, general superintendent motive power; P. J. Colligan, superintendent, Silvis shops; G. S. Goodwin, mechanical engineer; E. Wanamaker, electrical engineer; P. Koss, superintendent car department; W. F. Fitzgerald, master mechanic; J. C. Coles, master mechanic, and George W. Heyman, master mechanic. This is a practice that seems to be followed by many railroads and is an ideal way of getting the most out of the big exhibit.

Among our southern visitors is H. N. Rodenbaugh, vice-president of the Florida East Coast, who is here with Mrs. Rodenbaugh for their first convention.

Among the youngsters here this year is J. L. Mohun, Jr., a student in mechanical engineering at the University of Illinois. He is the son of J. L. Mohun, mechanical assistant to the president of the Union Pacific System.

W. J. Jenks, vice-president of the Norfolk & Western, and J. B. Parrish, general manager of the Chesapeake & Ohio, have thoroughly examined the exhibits. They obtained a good guide in Ed Walker. Nothing was missed from the tip end of the pier, through Machinery Hall, the track exhibits, and the buses and motor trucks in the big tent.

E. H. Walker, past president of the R. S. M. A., and president of the Walker Draft Gear Corp., is here this year with seven months' experience in sunny Florida. Mr. Walker with his son, James Walker, a graduate of Princeton and the University of Virginia, is operating a contracting business, building roads for Florida development and grades for the new extension of the Seaboard Air Line. Mr. Walker is a booster for Florida on a sane development basis and has great confidence in its future.

B. F. Flory, superintendent of motive power, New York, Ontario & Western, and Mrs. Flory celebrated, last Friday, their 25th wedding anniversary. At the same time their daughter Miss Eleanor Flory, celebrated the passing of another milestone of life. A party of friends gave a dinner at the Hotel Shelburne in honor of the dual event. Those attending were, Mr. and Mrs. B. P. Flory, Miss Eleanor Flory, Mr. and Mrs. T. H. Hopkirk, Mr. and Mrs. F. W. Spear, Mr. and Mrs. H. V. McKedy, Miss Emily Spear, Messrs. Fred Dunham and R. H. Weatherly.

J. W. Motherwell, vice-president and general manager of The Ashton Valve Company, seems to have a faculty of organizing business groups. His latest public service is the Kendall Square Manufacturers' Association, of which he is vice-president. This organization is made up of manufacturers in the particular part of Cambridge, Mass., in which is located the plant of The Ashton Valve Company. Its purpose is to improve facilities and better conditions for the manufacturers' interests. Mr. Motherwell has not missed a convention since his first at Old Point Comfort some twenty-five years ago.

Since Volstead's legions penetrated the kingdom of John Barleycorn, water coolers have frequently been the cause of disturbances by reason of the suspicion charged against them of carrying other fluids than that after which they are named. But it has been left to this convention to demonstrate that it is not alone in this way that water coolers can command attention. It appears that a water cooler that had been promised for the Vanadium Steel Company booth was discovered in another, all of which precipitated a controversy between those who wanted the cooler and those who had it. The differences were not adjusted until the delivery man was called in to explain. He soon learned that at these conventions a distinction must be made between the directory of the Railway Supply Manufacturers' Association and the Pocket List of Railway Officials. The delivery man had relied upon the Pocket List for his directions and had taken the number of the page on which the Vanadium "ad" appeared, as the number of the booth in which the water cooler was to be installed. The delivery man has been straightened out, but the Pocket List contends that he is rather to be complimented than condemned for his foresight in relying upon the Pocket List as the gospel of all useful information.

J. F. Jarrett, master mechanic of the Nevada Northern from East Ely, Nev., is attending the convention for the first time. He is thoroughly enjoying the cool breeze of the Atlantic, being accustomed to temperatures of 110 deg. in the great American desert.

Two years ago we reported the first appearance at the convention of George McCormick, superintendent motive power of the Southern Pacific at San Francisco. So favorable was his reaction that this year he has brought Mrs. McCormick.

A. S. Henry comes to the conventions this year as president of the Railway Steel Spring Company, having recently succeeded F. F. Fitzpatrick when the latter was elected president of the American Locomotive Company. Mr. Henry was previously vice-president, and has risen to his present position after many years of service with the company.

Announcement has been made by S. W. Midgley that, effective June 15, 1926, Midgley & Borrowdale will represent the Cleveland Tanning Company, Cleveland, Ohio, in the steam and electric railway fields. The line of leather products of the Cleveland Tanning Company includes "Hyaline", a dyed leather especially adapted to seat upholstery of railroad cars and motor coaches. Fred W. Wilhelmy sales manager of the leather company, is spending several days at the convention.

If any one has any question in his mind or doubt about the wisdom of up-to-date apprentice training, we suggest that he talk with H. M. Warden, mechanical superintendent of the M-K-T. Not only have apprentice schools been started at the important points on that road, but apprentice clubs have been organized; moreover, all of the apprentices on the system are occasionally brought together for a day or two for the consideration of some of the more important railroad questions and the relation of the young men in the organization to the work of the railroad as a whole. On such occasions the visiting apprentices have an opportunity of going through and studying the shop plant at the point where the meeting is held. A certain amount of recreation is also provided, in order that the boys may come to know each other better. They are developing into real "Katy boosters."

Friends of Walter B. Leach, president of the Hunt-Spiller Manufacturing Corporation, will be glad to know that he is feeling fine, although it will not be possible for him to get to Atlantic City this year. Two years ago he was prevented from attending the conventions because of the wedding of his son, Walter Barton, Jr. Mr. Leach had quite a tribute paid to him at the meeting of the General Federation of Woman's Clubs in Atlantic City a few weeks ago. According to the Boston Post of June 4, "There were two highly embarrassed, but at the same time highly delighted husbands in Boston yesterday. They had been publicly designated by their wives, speaking at the convention of the General Federation of Women's Clubs in Atlantic City, as ideal husbands. Their names are Walter B. Leach, president of the Hunt-Spiller Manufacturing Corporation, with huge premises on Dorchester avenue, South Boston, who lives in Brookline, and . . .". Later in the story the Post said, "Mrs. Leach, who is president of the Brookline Woman's Club, told the convention that 'the ideal club husband must have wisdom and energy and foresight, so that his talents can fill in where the woman's leave off,' as she pledged \$10. 'for the club husbands and for my 29th anniversary with mine.' " Gordon L. Leach, a son, who is a student at Harvard, is here for his first convention.

New Devices

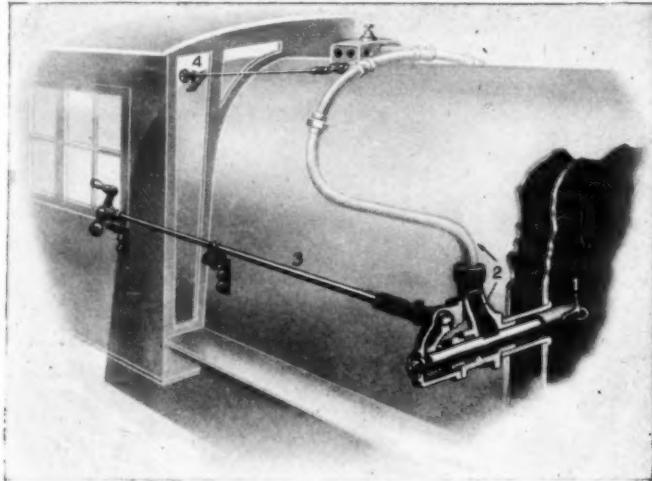
Changes in the Superior Locomotive Flue Blower

DURING the past few months the Superior locomotive flue blower, manufactured by the American Railway Appliances Company, Inc., New York, has been considerably improved especially in the operation and application to a locomotive boiler.

The application of the new type consists of replacing two waterleg staybolts with two short lengths of $3\frac{1}{2}$ -in. tubing, one on each side of the firebox. The blower is made up primarily of two nozzles so mounted on oscil-

ing the steam control valve. The operation is carried out for one blower at a time. The best results are obtained by using the flue blower on the road as the engine works. The flues should also be blown at the start and at the end of each run. When the blower is first turned on the exhaust is noticeably black as it is loaded with soot blown off the flues. When the exhaust is clear the flues are clean. This gives a visual evidence of the effect of the blower.

A number of railroads which have applied this device, are said to have in addition to the usual savings obtained by the use of the flue blower, also found considerable savings in the maintenance of the combustion chamber as well as flues, flue sheets and superheating units.



Phantom View of Superior Flue Blower Installation

lating sleeves that they project into the firebox through these tubes. The nozzles are made of an alloy to withstand the high temperatures existing in the firebox in the zone within which the nozzle is located. The sleeves are carried in body castings which are in turn mounted on the outside of the boiler approximately 36 in. back from the flue sheet. From this casting an operating rod connected to an oscillating crank is carried back to a convenient location in the cab.

Steam is piped from the steam turret to the body castings, where it is carried through ports to the oscillating sleeves and thence to the nozzles. The steam supply is controlled by valves with operating handles located within easy reach of the crew and so arranged as to operate one nozzle at a time.

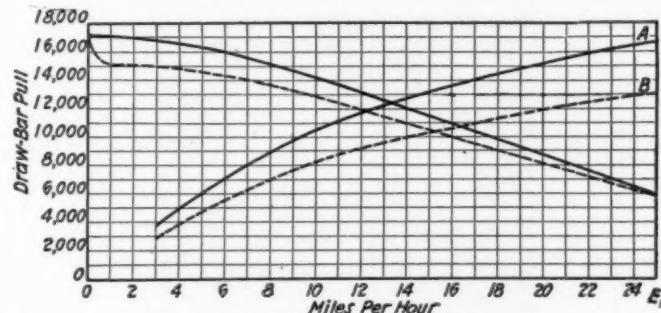
The nozzle directs a flat powerful jet of dry steam with uniform intensity into the flue sheet. This jet is from 8 to 12 in. in height.

Referring to the detail illustration shown herewith, (1) designates the steam outlet in the oscillating nozzle; (2) the steam supply pipe and steam passages through the blower; (3) the operating rod connecting the blower with the oscillating crank in the cab; (4) the cab control for steam supply.

The operation of the blower consists of first, opening the steam control valve; second, slowly turning the nozzle oscillating crank first in one direction as far as it will go and then in the opposite direction to its limit; third, clos-

Limited Cut-Off Applied to Locomotive Booster

THE FRANKLIN RAILWAY SUPPLY COMPANY, 17 East 42nd street, New York, is exhibiting a model of its locomotive booster in which has been incorporated the limited cut-off principle. The effect of the limited cut-off on the booster is shown in the accompanying chart. The solid black line represents the drawbar pull curve of the standard long cut-off



Curves Showing the Performance of a Booster with and without the Limited Cut-off Control

booster at various speeds. The dotted line represents the same locomotive booster after fitting it with the limited cut-off feature. The top curve, long cut-off booster, starts at 17,000 lb. and falls to 6,000 lb. at 25 miles an hour. This represents the standard long cut-off booster on a 36-in. wheel with 250 lb. boiler pressure. It will be observed that the dotted line, which shows the effect of the limited cut-off, drops below the solid line at speed, but still secures 17,000 lb. at the start. This is due to a special starting device on the booster valves. As the booster gathers speed, the power drops off somewhat and, at two miles an hour, it represents a decrease in power compared with a long cut-off booster of approximately 11 per cent. At 12 miles an hour, the difference is not so great, having been reduced to 9 per cent. At 20 miles an hour, it is still less, being only 6 per cent, and it will be noticed that as speed increases, the two curves approach each other.

Although a slight sacrifice of power is involved in using the limited cut-off, the result is a material save steam. Curves A and B on the accompanying chart show the

comparative steam consumption between the standard long cut-off booster (solid line) and the limited cut-off booster (broken line). The net effect of the use of the limited cut-off booster is said to be a reduction in booster steam consumption of approximately 30 per cent.

Locomotive Valve Pilot Gage

THE Distance-Speed Recording Company, 16 Wall street, New York, has on exhibition a locomotive speed recording gage in which has been incorporated an additional indicating pointer, the purpose of which is to guide the engineman in the proper setting of his reverse lever to correspond with the speed of the train. To present the precise reverse lever position currently to the engineman, it is necessary to express certain variables in terms of some known factor. The variables are piston speed in feet per minute, valve motion characteristics, locomotive speed, and position of the cut-off.

In the Loco-Valve-Pilot, these variables have been co-related and reduced to a common expression; viz, miles per hour. This is done by means of a cam, an instrument in the cab and the necessary connections.

The indicating and recording mechanism in the cab consists of a dial having two hands, a recording mechanism, a centrifuge and a rigging for partially controlling

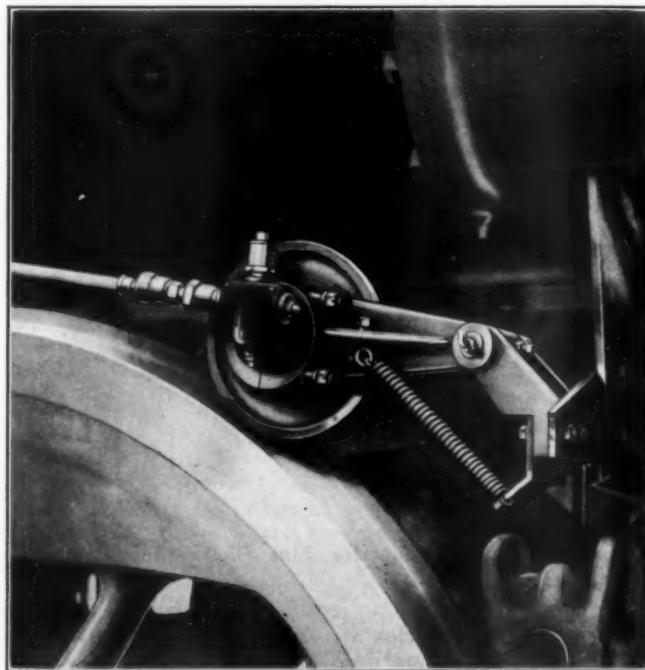


Loco-Valve-Pilot Gage which Indicates Both Speed and Cut-off

the movement of the cut-off recording pencil. One hand on the dial indicates the position of the reverse lever in terms of miles per hour, and the cut-off recording pencil records the cut-off used in terms of miles per hour. This hand and the pencil are connected by means of a post, rack and slack adjuster, and a cable to the cam and cam box located near the tumbling shaft, so that any movement of the tumbling shaft and, therefore, any change in

the cut-off, is indicated on the dial and recorded on the tape. The centrifuge is directly connected by means of a sturdy flexible shaft with the driving mechanism running in contact with one of the engine wheels. As the engine speed increases, the centrifuge tends to assume a more nearly horizontal position, and the amount of its displacement from its normal position is directly proportional to the speed of the locomotive, so that all speed indications and records under any given conditions are uniform and all changes in speed are instantly shown and recorded. Interlocked mechanically with the centrifuge is the other indicating hand on the dial and a recording pencil which indicates and records the engine speed in miles per hour.

The centrifuge actuates the tape feeding portion of the instrument in the cab. The paper tape upon which is recorded the cut-off and speed is caused to unwind from one spool and wind on the other, the rate of feed being proportional to the speed of the locomotive. This tape recording mechanism and tape are carried under the top



Speed-Indicating Driving Mechanism

cover of the instrument in the cab. The cover is locked so that the tape cannot be removed except by the individual charged with its care. It is calibrated by lines vertically and horizontally. The vertical divisions are one-half inch apart, and each division corresponds to one mile of track. The horizontal divisions represent miles per hour, the tape being graduated for each 10 miles per hour from zero to 90 miles per hour. These calibrations facilitate quick interpretations of the cut-off and speed graphs and enable accurate determination of the speed in miles per hour and the cut-off used at any point on the run.

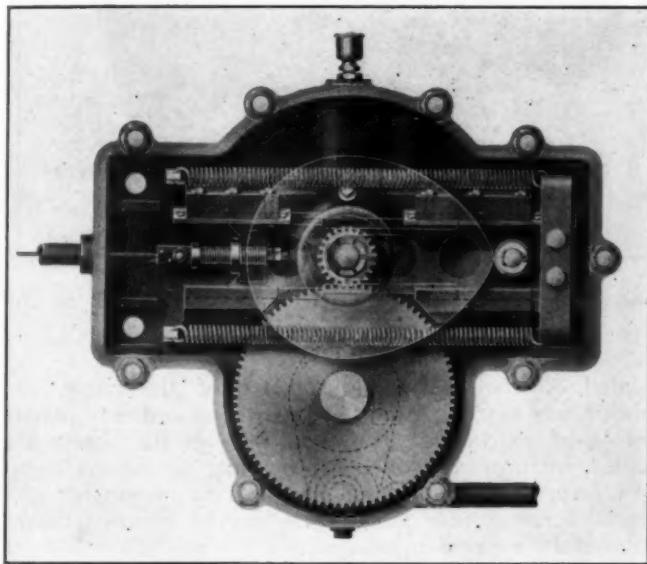
Two independent graphs are inscribed on the tape, one by the speed recording pencil and one by the cut-off recording pencil. The cut-off recording pencil is mechanically interlocked with the cut-off indicating hand on the dial and the speed recording pencil with the speed indicating hand, so that the cut-offs (reverse lever positions) used, and the speeds attained are always recorded precisely as they are indicated. Should the reverse gear creep, the Loco-Valve-Pilot will show the actual cut-off

being used regardless of the position of the reverse lever.

The position of the speed recording pencil when the locomotive is stopped is at the top of the paper tape, and that of the cut-off recording pencil at the top when the reverse lever is in the full forward position. The graph inscribed by the speed recording pencil is read directly and the graph inscribed by the cut-off recording pencil is read in its relation to the speed graph. Only when the cut-off graph is parallel to and very close to the speed graph, except of course at those points where a change in cut-off is recorded, is the correct cut-off for the particular speed shown to have been used.

The tape being fed on the basis of miles travelled, the rate of travel of the tape is directly proportional to the speed of the locomotive. By use, therefore, of a keyboard constructed on a scale of one-half inch to the mile of roadbed, the various stations and other points on the road can be indicated. The recording tape when laid along such a board is easily read as to points on the road, and the details of speed and cut-off applying to each point on the road are noted.

The cam box is located near the tumbling shaft, and is rigidly attached to the boiler barrel or the engine frame, as is most convenient. It contains a cam, the surface of which is in constant bearing with a roller and slide. The



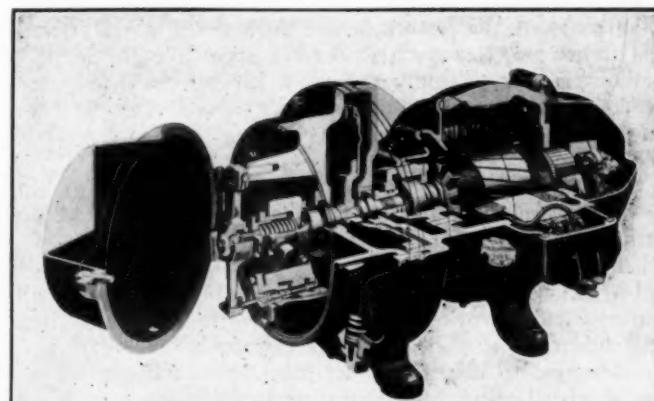
The Cam Box of the Loco-Valve-Pilot Gage

latter has attached to it a cable which in turn is passed through $\frac{1}{2}$ -in. conduit to the instrument in the cab. The cam is connected to the tumbling shaft through a gear, a lever and lever arm, and a collar clamped on the tumbling shaft. Thus, every moment of the tumbling shaft is communicated to the cam, which translates those movements into terms of miles per hour. They are mechanically transmitted by means of the cable to the instrument in the cab, where they are indicated by a hand on the dial and recorded on the tape by the cut-off recording pencil. Thus, any change in the cut-off is instantly indicated and recorded, as is any creeping of the reverse gear which may occur.

The driving mechanism is sturdy and consists of a friction wheel running in contact with the periphery of the engine wheel, and worm gears transmitting the revolutions of the friction wheel to the flexible shaft which is in turn connected to and actuates the speed indicating and recording portion of the instrument in the cab.

A 750-Watt Turbo-Generator for Train Control

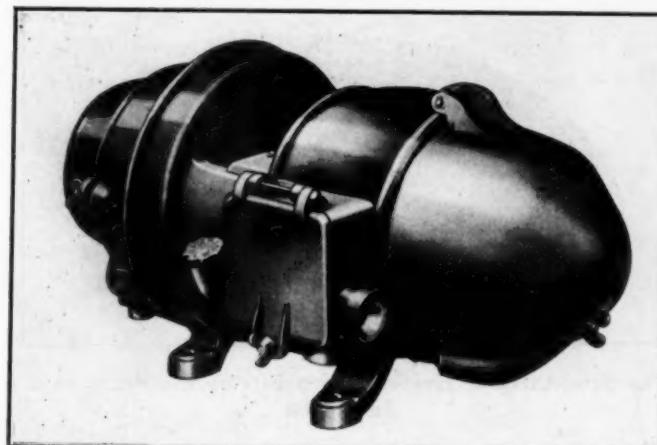
FOR train control service the turbo-generator must have characteristics not called for by the generator used only for locomotive lighting. Freedom from detrimental voltage ripple and stray currents and uniform and constant voltage are essential. In turbo-generator type RE-3G, made by the Sunbeam Electric Manufacturing Company, Evansville, Ind., these features are safeguarded by the electrical characteristics of the generator and the governor. Detrimental voltage ripple and stray



Phantom View of Generator Showing Type of Construction

currents are eliminated by a wave wound armature with the armature slots of an angle to the pole faces, a commutator having double the usual number of segments and wide brushes. Good commutation is assured by box type spring-held brush holders and a ball bearing at the commutator end of the shaft which eliminates commutator wobble. The constant speed governor is designed to maintain constant voltage throughout the entire range of loads and steam pressure changes.

The type RE-3G train control generator is designed



Sunbeam 750-Watt, Type RE-3 G Generator

for both continuous and intermittent train control service. It is a two-pole 750-watt capacity 32-volt generator driven by a two-stage radial impulse turbine. To safeguard its performance all parts are enclosed in a water tight, dust proof case. The terminal box is integral with the main frame and tapped for right conduit.

The governor is rugged and has unusually heavy weights. It is balanced to respond to very small variations in speed and maintains practically constant voltage

at all times. Actual service has shown that it will maintain speed and voltage settings over a long period of time. The governor operates in the atmosphere where it can be effectively lubricated. Lubrication is positive which effectively prevents wear. This maintains the original valve travel setting over long periods and reduces frequency of adjustment.

The steam valve controlled by the governor is of the balanced piston type. It works in a renewable cage in the generator frame. Steam pressure opens it and the governor tends to close it, thus controlling the steam to the turbine. In event of failure of the governor mechanism steam pressure moves the valve to cut off position stopping the flow of steam to the turbine and preventing excessive speed.

All parts of the generator are enclosed in a water and dust tight case, but are also readily accessible for inspection or repairs. Simply raising a hinged cover exposes the commutator end, opening a hinged cover at the turbine end exposes and gives easy access to the governor mechanism.

Adjustment or replacement of a part is a matter of but a very few minutes and all parts are interchangeable, no fitting being required.

Lubrication is simple, the shaft turns on ball bearings and a ball bearing takes the governor thrust. These ball bearings which work in an oil bath are the only parts that need lubrication. The oil wells cannot be overfilled and are designed to insure perfect lubrication without allowing oil overflowing and saturating the windings.

Coffin Feedwater Heater System

A FEEDWATER heater system which consists of a centrifugal type, single-stage steam turbine pump and a closed type feedwater heater, is being exhibited by the J. S. Coffin, Jr. Company, Trust Company building, Jersey City, N. J. The pump which is $24\frac{1}{2}$ in. long and $19\frac{1}{8}$ in. high, is usually mounted on the trailer truck frame. It is of the centrifugal type driven by a



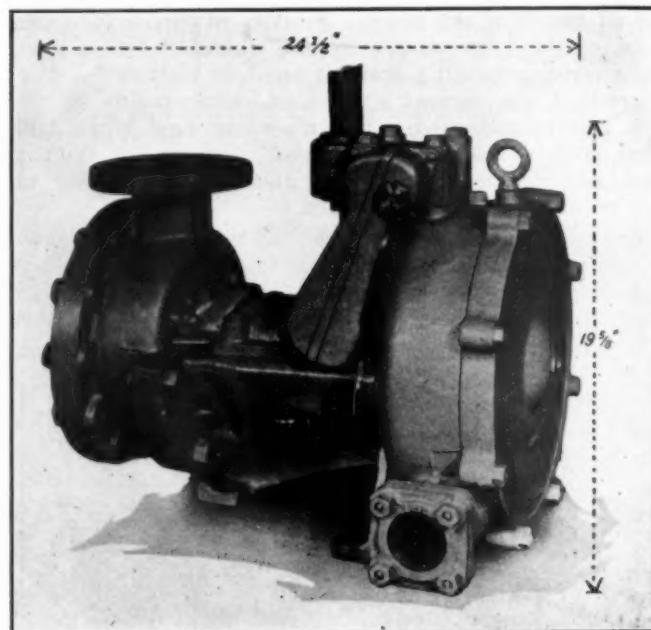
The Semi-Circular Heater Which Fits on the Front of the Smokebox

single stage steam turbine. The pump rotor and turbine wheel are mounted on the same shaft. The complete pump portion of the unit is made of bronze which effectively resists corrosion. The bearings are enclosed in an oil, dirt and moisture proof housing which serves as a reservoir for the lubricating oil which is fed to the bearings by means of oil rings.

The pump delivers a steady flow of water to the boiler which eliminates the effect of pulsations on heater tubes, boiler checks and piping. The rate of discharge is controlled by the amount of steam admitted to the turbine and can be adjusted precisely to meet varying conditions of operation.

Except in the frictionless bearings themselves there is no wearing contact. The pump is so light in weight and so located on the locomotive that two men can handle it without a crane or other equipment. It can be removed from the engine and completely disassembled in less than two hours. There are no passages in the pump less than $\frac{3}{8}$ in. wide and strainers of especially fine mesh are not required. Although the pump is small in size, its capacity is high, the nominal delivery being 9,000 gal. per hour for boiler pressures of from 175 to 250 lbs. per sq. in.

The tubes in the closed type heater run lengthwise through the semi-circular casing. The tube sheets are



The Centrifugal Pump, Which May be Located on the Trailer Truck Frame

located on the horizontal diameter of the circle, the tubes being expanded into them with an ordinary standard $\frac{1}{2}$ -in. expander. The tube holes in the sheets are drilled, no prosser grooves or reaming operations being necessary. It is considered unnecessary to provide any special form of tube joint as the curved form of heater relieves the expansion strains.

The heads, which bolt against the tube sheets, are rigid, it being unnecessary to provide for differential expansion of the tubes. The heater is divided into the proper number of passes to give the proper velocity through the tubes, this velocity being necessary to procure the proper heat transfer. Owing to the unique arrangement of the heater, it is said that this velocity can be made correct without the use of any form of agitator. The elimination of the agitators or retarders assists in keeping the tubes clean and facilitates the cleaning operations.

The tube bundle is securely held in place by two spacers located approximately 30 deg. from the vertical center line of the heater. These spacers prevent the tubes from vibrating and from touching one another.

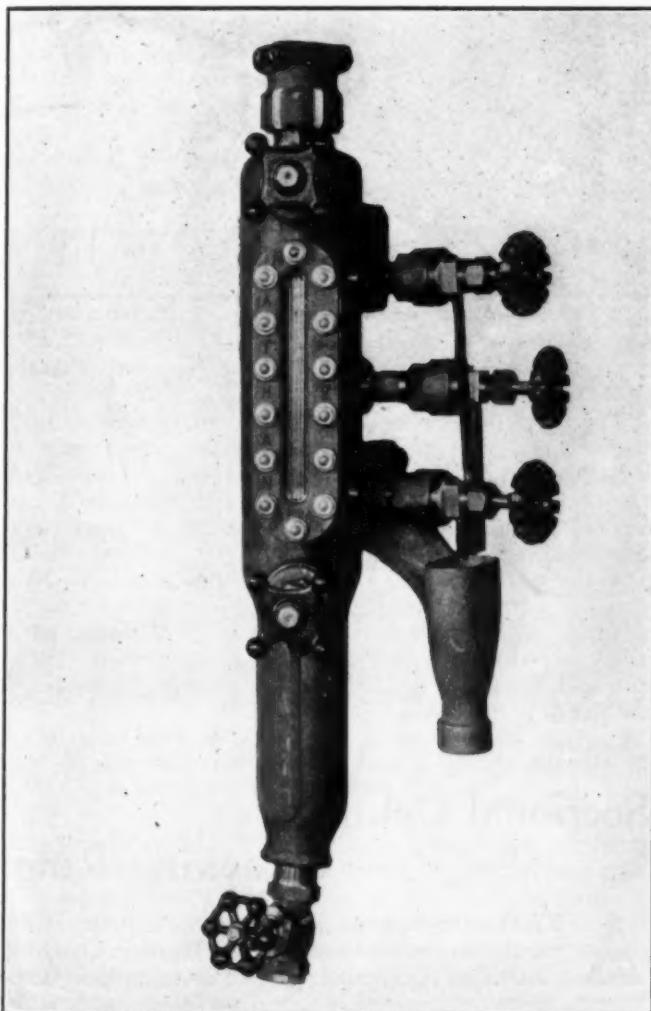
A perforated baffle plate runs the entire length of the heater and distributes the steam uniformly along the final passes of the water, to assure a high mean temperature difference in the last passes.

The heater is mounted on the smokebox front plate by means of three shoulder studs which are secured by nuts and locknuts inside of the smoke box. This method of securing the heater eliminates the use of brackets. The heater, which is designed with 15 sq. ft. of heating surface, weighs 1,420 lbs.

Locomotive Water Column with Integral Water Glass

THE W-B locomotive water column, Type C, designed to eliminate the pipe connections, screw joints and gaskets necessary when independent water gages are attached to the column is being exhibited by the Nathan Manufacturing Company, 250 Park avenue, New York.

It is also designed to meet the I. C. C. requirements and is a self-contained appliance comprising within itself the gage cock compartment and the water gage. On account of its construction, when once applied, it becomes a permanent fixture on the boiler and there can be no change in the height of the lowest reading of the water gage or gage cocks above the highest point of the crown sheet, due to changes in nipples or fitting, as none are required. The ports connecting the water gage compartment to the water column are large in diameter and short, thereby tending to prevent the accumulation of sediment.



Self-Contained Water Column which Fits Close up to the Boiler Head and Requires a Minimum of Space

The elimination of long ports of small diameter and the water glass steam pipe results in more uniform temperatures.

The water gage is of the reflex type, the glass being embedded in the body of the column casting and secured by means of tee-head bolts made of a non-corrosive metal. The gage is designed so that it is impossible to apply a

glass in such a manner that the lowest reading of the water gage fails to correspond with the lowest gage cock reading. The reflex glass is so located with respect to the engineman as to be easily observed from his normal position. The gage cocks are screwed into the body of the column on the right side so as to be more easily operated by the engineman, and out of the way of the throttle lever and rigging.

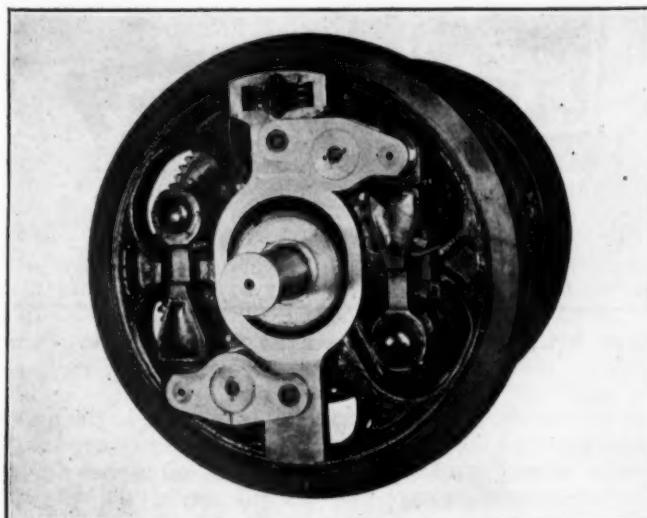
The water gage is provided with an upper and lower valve controlling the admission of steam and water from the water column into the water gage compartment. The valve stems are provided with double seats and the valve bonnets have warning ports leading from the water gage compartment to the atmosphere which blow jets of steam, except when both valves are wide open or fully closed.

Both water glass valves have renewable seats which are screwed into the body of the column. The steam pipe coupling nuts are provided with safety clamps which insure against failure of the brazed or swaged pipe joints.

Balanced Link Drive for Electric Locomotives

A LINK drive for electric locomotives which has been developed to incorporate the greatly desired feature of balance, is being exhibited by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. This particular equipment has been in about 12,000 miles of service on a heavy duty electric locomotive from which it was removed for exhibition.

The mechanism is assembled on the outside of one wheel only of each pair of drivers, having the balance



View of Driver Showing Balance

feature, the drive is symmetrical regardless of concentric or excentric positions of the axles due to irregularities in the track. By the use of balanced link drive, it is possible to obtain a minimum of dead weight at the rail for each driving axle, a condition that is most desirable on all locomotives, particularly those operating at a high rate of speed.

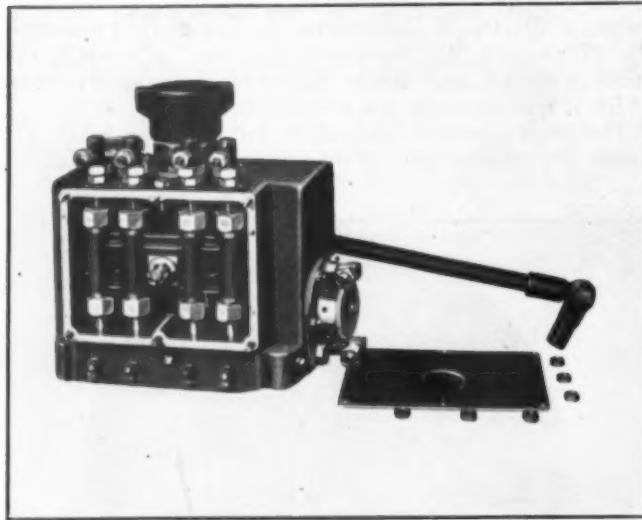
The construction of the mechanism allows ample box movement. A spring cushion in the driving parts absorbs difference of accelerating and decelerating rates of gear rim when the axle and quill are not concentric.

Locomotive Force Feed Oiler

THE Model A locomotive force feed oiler, which is being exhibited by the Detroit Lubricator Company, Detroit, Mich., has been designed to lubricate the valves and cylinder of a locomotive and for easy access to the elements. The pumping mechanism which is outside of the reservoir is fully protected against dirt and damage. The ratchet and heater are of unit construction. The design lends itself to easy installation; there are four mounting connections on the bottom of the reservoir for attaching the oiler to the locomotive.

The pumping mechanism consists of a header, of which the cylinders are an integral part, which travels through a vertical reciprocating cycle driven by an eccentric, and two plungers in each cylinder, both of which are stationary. One plunger has twice the displacement of the other. The shaft to which the eccentric is attached derives its motion from a ratchet which in turn is connected through a drive arm to a moving part of the locomotive.

On the suction stroke, oil which has filtered through a strainer is drawn through a passage past ball checks and through the plunger passage to a chamber. On the down stroke, oil in the chamber is forced through another passage past ball checks to the chamber of the other plunger. Since the second plunger has only half the displacement of the other, half the oil is then forced through an oil passage and discharged into the oil deliv-



Type A-4, Four-Feed Force Feed Oiler with the Pump Cover Removed

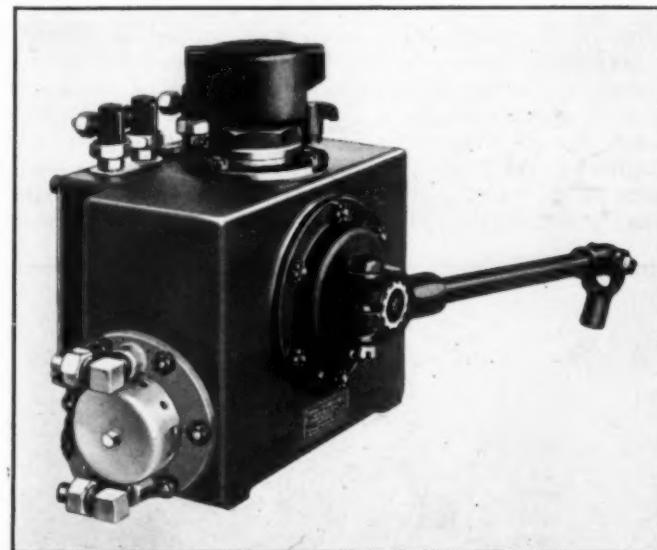
ery tubes; the other half of the oil is retained in the upper chamber until the header reverses its cycle of travel and, on the upward stroke of the header, this oil is then forced through the oil passage and likewise discharged into the oil delivery tube. Tell tales are provided which indicate whether the individual feeds are operating properly. They are located at the discharge outlet for each feed.

The heater unit consists of a thermostatic power element which operates to open and close within a narrow temperature range, also a valve operating arm, regulating rod and suitable heating tubes. The power element is a metal bellows charged with a liquid. It expands longitudinally with a rise in temperature and contracts with a lowering of temperature and, being connected to the valve by the operating arm and regulating rod, closes and opens the valve as it expands and contracts.

Live steam admitted through the inlet passes by the valve into the tubes until the oil is heated to the proper temperature, at which point the valve is closed through

the expanding action of the power element. A slight drop in temperature causes the power element to contract and reopen the valve.

The strainer for the oil entering the various feeds is in the form of two cylinders, both of which are inserted in the lower part of the reservoir at opposite ends and made so that they may be easily removed as units for the purpose of cleaning. A fine mesh screen of brass is assembled around a cast spindle, the inner end of which is supported by a center lug and the outer end screwed into the reservoir. This strainer arrangement should prevent any dirt from entering the pump mechanisms. These



Type A-4, Four Feed, 24 Pint Capacity Lubricator

strainers are supplemented by a much coarser basket-shaped strainer under the filler cap.

The filling hole is of large size to make filling of the reservoir easy. The filler cap has vents which maintain atmospheric pressure within the reservoir. These vents are so placed as to make it impossible for water or foreign matter to enter the reservoir through them. A rod type of oil gage is placed in the top of the reservoir which makes it easily possible to check the amount of oil. It is supplied with an anchor so that it cannot become detached and lost. A hand crank is supplied with each oiler. It is used for priming the delivery tubes at the time of installation and is further used by the shop men to see whether the pump is delivering oil properly.

Sectional Cylinder Packing Rings

A NEW development in sectional cylinder packing rings is being shown by the Hunt-Spiller Manufacturing Corporation, 383 Dorchester avenue, Boston, Mass. This company has produced and patented a ring known as the Duplex cylinder packing ring and the Duplex spring. The ring has all of the essential requirements of a steam-tight ring, as well as additional strength of section and simplicity of design for insuring long service. The spring is made of a special steel and is said to withstand the high temperatures encountered in the use of superheated steam. It can be used not only with a Duplex ring, but also with the Dunbar type of ring which is used by many railroads. The Duplex ring is designed to produce as nearly as possible equal radial pressure at all points of contact around the ring.

Reducing Cleavage Planes in Thermit Welds

THE Metal & Thermit Corporation, 120 Broadway, New York, has developed an improved method of using Thermit which requires much less material and eliminates the cleavage plane. Samples of Thermit welds made by the old and new methods are a part of this company's exhibit during the conventions this year.

In order that the improvements may be fully understood, it should be borne in mind that in the previous practice it was considered desirable to provide a gap between the two ends of the sections to be welded together, this gap being approximately one quarter of the thickness of the section to be welded. The surrounding collar of Thermit steel was constructed with a width equal to the thickness of this section and the thickness at the center part was equal to the gap or one quarter the thickness of the section. Large risers were provided in order to feed the shrinkage in accordance with regular steel casting practice. In Thermit welds made in this way, the parent metal was fused on the outsides of the sections practically to the outer edges of the collar, and this fusion extended in broad sweeping lines which approached each other at the center of the section, at which point they were separated for a distance of about twice the original gap. It was found, however, as a result of numerous tests that welds made in accordance with this practice contained an

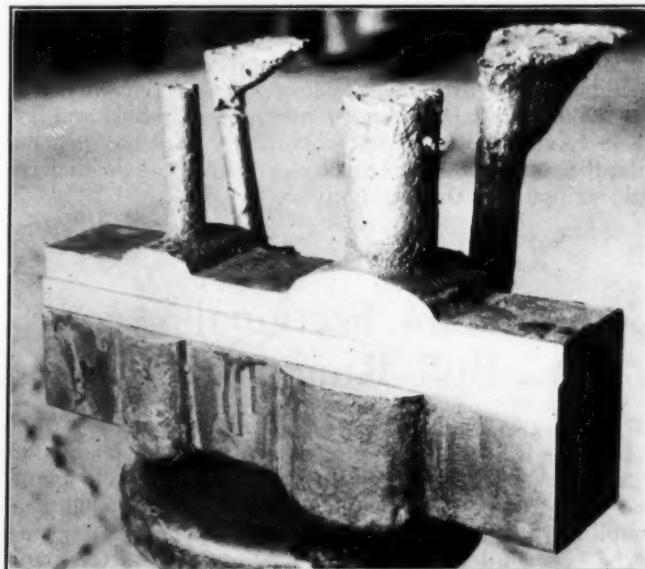


The Weld at the Left is by the New Method and that at the Right by the Old—Note the Difference in the Amount of Surplus Metal

internal defect which, for want of a better name, has been called a cleavage plane. This defect was discovered in a series of tests in which the welds were broken under a trip, after all excess metal had been machined off. It was discovered that there existed an area just below the axis of the piece on a vertical plane running through the middle of the gap where the metal had been torn apart during solidification and around which the crystals had been very much overstrained. An examination of the fractures showed what appeared to be a dull, gray looking material at this point surrounded by the regular shining crystals of fractured steel. In some cases this area was more prominent than in others but its existence was always found by the comparison of tensile strengths of test coupons taken from various parts of the weld. A careful study of the micro structure of Thermit welds proved what was really most logical; that is, that the welds solidified first across the gap between the sections practically on the axis of the

pieces and that freezing was progressive from this point outward, and that the part last to freeze was the collar surrounding the weld.

It was immediately evident, therefore, that the large risers used in Thermit welding practice were not necessary because the weld freezing from the inside toward the outside was just the reverse of the direction of freezing in ordinary casting practice. The function of the riser in Thermit welding, therefore, was simply to act as a vent at the top of the mold and to feed the shrinkage of the top part of the collar which was probably the last to freeze. It was discovered that the part of the weld first to freeze coincided with the place where this cleavage plane existed and it was evident, therefore, that as the weld first started to solidify, some force existed which tended to tear this newly frozen section apart. Further research showed that this freezing at the center of the weld occurred within a



The New Process Shows no Cleavage Plane After Machining

very short time after the weld was poured, the sections being welded acting as chills and carrying the heat away very rapidly. It was found, further, that the outer fibers of the sections being welded would not reach their maximum temperature during preheating and not until an appreciable time after the weld was poured. In other words, the heat from the Thermit steel collar and from the riser continued to penetrate the solid metal of the parts being welded for some time after the weld was poured, causing these parts around and adjacent to the collar to continue to grow in length, even after the center portion began to solidify. It was this force, therefore, that acted like an enormous jack and tore the center section apart. In referring to this tearing apart it is, of course, clear that this is merely a matter of degree and that in many cases the cleavage plane was not actually opened but merely badly over-strained.

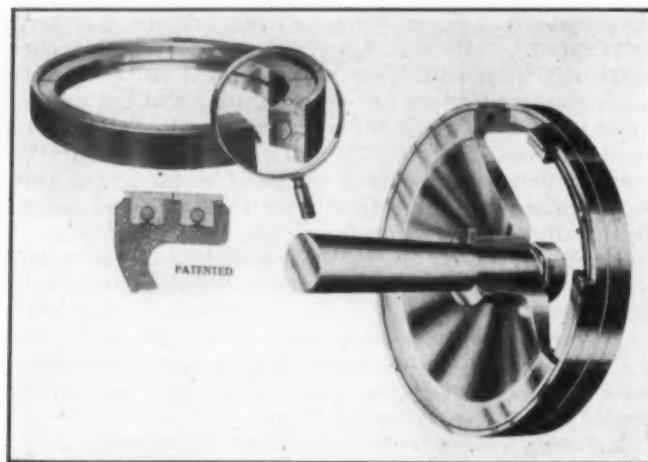
Many ways were tried to overcome this internal defect, most of which consisted of changes in design, which tended to feed the shrinkage of this internal part of the weld. The extra molten metal added on the outside simply aggravated the condition. Obviously, there are only two ways by which this internal defect could have been overcome: First, by increasing the gap between the ends to be welded to a maximum so as to reduce the ratio of heat on the outer fibers to the heat along the axis and, second, to decrease the gap between the ends to a minimum at the same time decreasing the excess heat in the collar and in the riser so that in this way the ratio

between the heat on the outside and the heat at the axis would be more nearly uniform. This latter way was tried because the other would tend toward an uneconomical use of Thermit. It was found that by a careful proportioning of the gap, width and thickness of collar, and by reducing the riser to a minimum, the cleavage plane was eliminated, so that test coupons taken from all parts of a weld vary only a fraction of a per cent. The new micro photographs do not show the broad sweeping curves of fusion which were typical of the former Thermit practice but rather straight fusion lines to within an inch or so of the outside portions of the section.

From an engineering standpoint, this elimination of the cleavage plane was a great step in advance and because the new proportioning of the parts so definitely accomplished this object, it was found that the idea was patentable. But great as was the result from an engineering standpoint, the advantages from a practical and economic standpoint were even greater, because the new design enables a Thermit weld to be made with less than half the amount of material previously required. This, in turn, permits the use of smaller crucibles, smaller mold boxes, less molding material, quicker ramming of molds and less labor. As a result the welds are now completed at about half the prior cost, in much less time and with very little stripping of the locomotive.

Combination Sectional Bull Ring and Packing

THE Locomotive Finished Material Company, Atchison, Kan., is exhibiting a new type of piston bull ring which combines the bull ring and packing into one unit. In its construction the piston design has been simplified and the weight reduced by approximately one-half. The bull ring is a sectional packing of tee cross-section covering the entire face of the piston. As shown in the illustration, each half section is cut in six pieces around its circumference. A high temperature heat re-



Sectional Bull Ring which Combines the Bull Ring and Packing into One Unit

sisting alloy steel expander spring fits into a circumferential groove formed between the half-sections of the tee rings. This spring is formed with a dowel on one end. Two of the half-sections of the tee ring have holes drilled in them and are so spaced that when the doweled end of the expander spring is placed in these holes, the sections are spaced so that the joints are held in a staggered

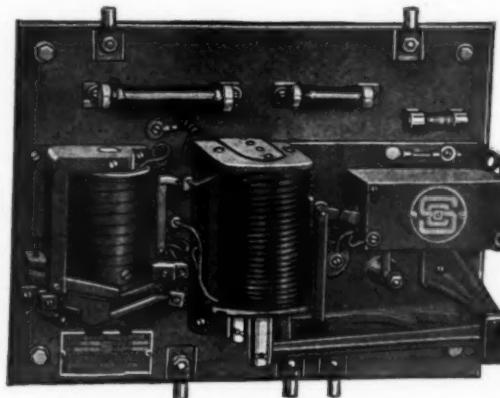
position. The grooves in the piston are accurately machined to a depth such that the rings bottom in the groove, thus carrying the weight of the piston on the rings.

The piston proper is made of high tensile steel of double the strength of the metal ordinarily used in a piston. This simplified design, together with the kind of material used, permits reducing the weight of the complete piston by about one-half. This reduction in weight is important as the piston is the fastest traveling and heaviest reciprocating part.

The combination of bull ring and packing simplifies maintenance and repairs. When the combination packing and bull ring is worn as much as the ordinary bull ring can be worn, its renewal costs no more than the renewal of a set of packing.

Safety Lighting Equipment for Gasoline Rail Cars

THE first gasoline rail cars—merely motor coaches applied to rails—retained the standard low voltage automotive type of lighting equipment, but experience has taught the railroads that conservatively rated generators, ample battery capacity and regulation of both battery charge and lamp voltage are necessary for economical and proper lighting of their cars. In order to meet these conditions the Safety Car Heating & Lighting



Type K Generator Regulator

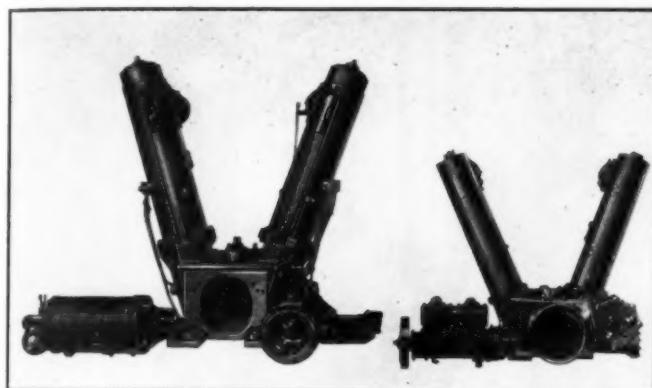
Company has developed a special line of generators and regulators.

The generators are obtainable in one or two kilowatt capacity each, with a voltage rating of 40 volts. One machine furnishes 50 amperes at this voltage while the other has a capacity of 25 amperes. Both machines are exactly the same as regards outside dimensions, having an outside diameter of 11 in. and an over-all length of 20 in. Each machine has a weight of 195 lb. which is a little less than the equipment used in axle lighting systems of standard coaches.

A special type of generator regulator has also been designed to be used in connection with these generators, known as the type K. When this is used with one of the generators, it is possible to operate the latter at three times normal speed without injury. A second regulator of simple construction has been developed for the regulation of the lamp voltage. All of this equipment will be found in the exhibit.

Types D-4 and D-1-A Duplex Locomotive Stokers

AMONG the new types of Duplex stokers being exhibited by the Locomotive Stoker Company, Pittsburgh, Pa., will be found the type D-4 and D-1-A. The D-4 stoker was developed to meet the demand for stokers for locomotives where the space for applying the previous Duplex stokers is limited and for locomotives used in foreign countries, the design exhibited having

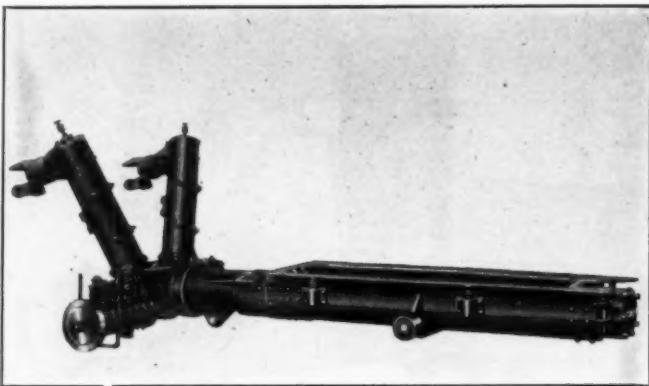


Comparative Sizes of the Duplex D-1-A and D-4 Stokers
Showing the Small Size of the D-4

been developed for a Pacific type locomotive for the Belgian State Railways.

The same general principles of the former types of Duplex stokers are also embodied in the D-4 except in the driving mechanism, which is entirely different. The whole stoker is much lighter and smaller than any of the previous models.

Instead of the reciprocating engine as used on the other Duplex designs the D-4 is driven by a four-cylinder,



General Arrangement of the Duplex D-4 Stoker Showing the
New Driving Engine

single acting steam engine mounted on the transfer hopper in the same relative position as the driving engine on the previous models. Instead of the elevator and conveyor screws being driven by a pawl and ratchet mechanism, the D-4 screws are driven from the main drive shaft by a worm and worm-wheel arrangement, the main drive shaft being connected direct to the four-cylinder engine. This gives a continuous feed of all screws and permits a much smaller and lighter design. The conveyor trough is the same in principle as used on all other Duplex stokers

except that it is made considerably lighter by using a slide support and crusher support of a different design.

The engine is governed by a piston valve governor located in the center of the engine body and actuated by oil pressure supplied by a spur-gear oil pump located on the right end of the transfer hopper and directly connected to the main drive shaft. The crank shaft is supported by three sets of roller bearings lubricated by the splash system. The wrist pins and connecting rod bearings are also lubricated by splash from the crank case. The main drive shaft extends through a case cast in the bottom of the hopper and runs in oil or light grease.

One new feature on this stoker is the method of moving the dividing rib. Spur gear teeth are cast on the rear of the rib and these mesh with a spur gear mounted at the back center of the hopper. The spur gear shaft terminates in a square which extends above the hopper and is easily accessible. The dividing rib is held in place by a steel pin going through the hopper wall and between the spur gear teeth. This method makes an easily operated device for setting the dividing rib.

The feature of the type D-1-A Duplex stoker, which is being exhibited for the first time, is a special arrangement for alternating the delivery of coal to the two sides of the fire box.

Metal Center Packing

THE Garlock Packing Company, Palmyra, New York, has recently placed on the market and is exhibiting this year a new type of packing known as 377, a feature of which is a metal center. It is a lubricated, non-friction metal packing with the side walls, back and cushion of frictioned asbestos cloth.

The metal core of the packing is manufactured from



Garlock 377. Metal Center Packing

a solid piece of non-friction metal. The design procures a number of small metal surfaces so staggered as to give a pressure tight bearing on the rod. Diamond cuts in the metal impart flexibility to the packing, enabling it closely to encircle the rod. The small round punchings act as emission holes for the lubricant that is retained in the many folds of the metal.

The asbestos side walls and back hold the metal in place and the folded asbestos core outside the metal acts as a pusher and compensating cushion to bring the metal to the rod at an even pressure. The ratio of wear on the bearing surface of the packing is the same at all times on account of the square construction of the metal core.

Lubricating Locomotives with the Alemite System

THE same principle of high-pressure lubrication used on the automobile is now being adopted by railroads for the lubrication of locomotives, other rolling stock, signal devices and shop machinery.

The system of Alemite lubrication as applied to locomotives consists of a compressor containing the lubricant, which can be instantly attached to a nipple, threaded to take the place of the ordinary grease cup, plug or cap. In some cases where oil holes only are provided, the nipples are threaded into these holes. These nipples are spot welded in place so that there is no possibility of their working out or becoming lost. The Alemite system is used to lubricate the main rod, side and eccentric rod bearings, crosshead wrist pin bearing, valve gears and



Hand-Operated Alemite Compressor which Holds 15 Lb. of Lubricant and Develops 2,500 Lb. Pressure

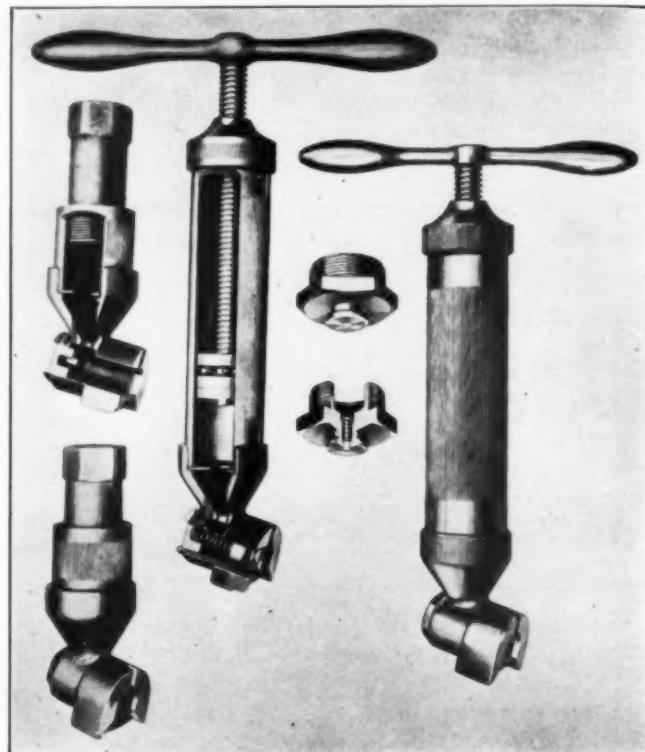
outside motion, wheel hub plates, bell yoke bearings, and headlight generator bearings.

The principal use of Alemite for passenger coaches is for truck pedestal bearings and for car lighting equipment.

The Alemite equipment for the complete lubrication of a locomotive consists of several sizes of fittings, the difference being largely in the size of the lubricant aperture. For main and side rod lubrication, equipment like that shown in one of the illustrations is used. This consists of a button head nipple that is threaded into the bearing aperture and spot welded. The nipple has a passageway sufficiently large to admit the grease under high pressure. A spring and valve arrangement closes the passageway immediately when the inward pressure on the grease is relieved. This prevents the lubricant from escaping out through the nipple, and at the same time prevents grit from getting into the bearing.

To lubricate, the operator unscrews the handle of the

compressor as far back as it will go, removes the cylinder cap and inserts the sticks of hard grease. The claw-like coupling of the compressor is hooked on the button head of the nipple, instantly forming an air-tight seal. By turning the handle to the right, the operator develops tre-



Alemite Compressors and Fittings for Main and Side Rod Lubrication

mendously high pressure against the grease and forces it into the bearing. A reverse turn of the handle relieves the pressure so that it is easy to remove the compressor from the nipple, and at the same time prevents grease from escaping through the coupling.



The Pneumatic Compressor Holds 25 Lb. of Lubricant and Develops Approximately 2,000 Lb. Pressure

The Model H-15 Alemite service compressor shown in one of the illustrations holds 15 lb. of lubricant and develops a pressure of 2,500 lb. per sq. in. It is ideal for operation in and around engines where the space is crowded. It is operated like a hand water pump; that is, to force lubricant into a bearing, the operator merely works the handle up and down.

The Alemite P-25 compressor, also shown, is especially suitable for enginehouse or terminal lubrication, or in shops where there is a very considerable quantity of work to be done. It holds 25 lb. of lubricant and is moved about on four castors. It is operated by air.

This model delivers grease to bearings at a pressure ranging up to approximately 2,000 lb. per sq. in., depending upon the air pressure supplied to the compressor. The ratio of pressure delivered at the bearing is approximately sixteen times the air pressure supplied to the compressor. The maximum air pressure that it will handle is approximately 200 lb. To operate the compressor, the greaser merely opens the air valve, attaches the end of the lubricant hose to a nipple and then squeezes the lubricating valve.

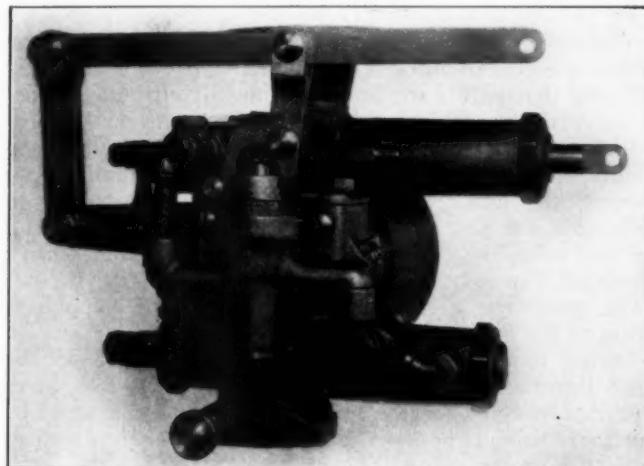
This Alemite equipment is being exhibited by the Bassick Manufacturing Company, 2650 North Crawford avenue, Chicago.

An Automatic Whistle Blower

A WORKING model of an automatic whistle blower is being exhibited by the National Safety Devices Company, Waterloo, Iowa, which in addition to blowing a highway crossing warning, blows any signal desired. Referring to the illustration of the quadrant and lever with which the engineman operates the auto-

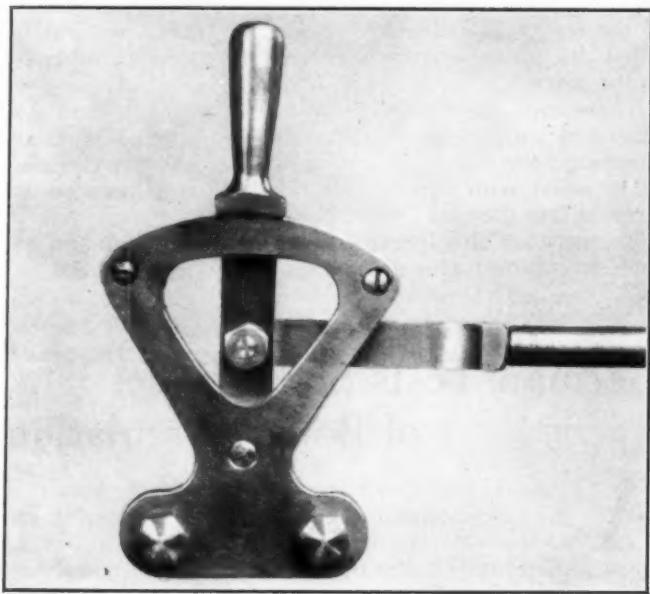
engineman can instantly move the lever into the rear position, leaving him free to use both hands to control the train, while the whistle is being sounded continuously.

This device makes it possible for a railroad to standardize highway crossing warnings on all of its locomotives



Rear View of the Automatic Whistling Device

based on 9, 10, 11, 12 or 13-second crossing whistles. It also eliminates any tendency on the part of enginemen to blow inadequate warnings which may not be heard at the highway crossing.

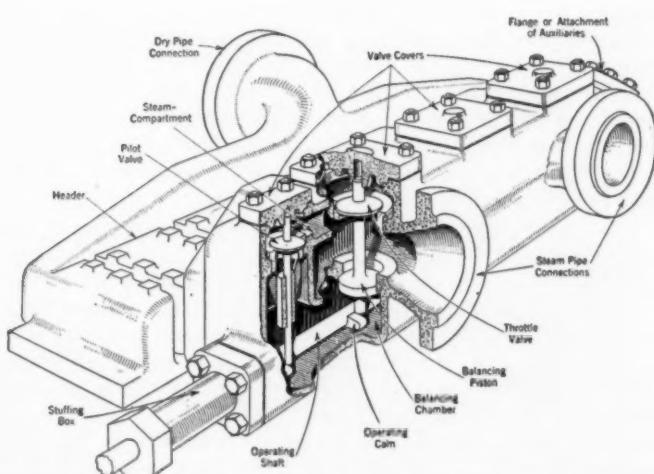


The Quadrant Provides for Automatically Sounding Crossing Signals and Manually Sounding Other Signals

matic whistle blower, if the engineman desires to give the highway crossing warning, he pushes the lever to the extreme forward position. The mechanism for blowing the highway crossing warning, automatically comes into action and the whistle is sounded loudly, clearly and accurately without further effort on the part of the engineman. If he desires to blow a station whistle or call in a flagman, or blow any other signal desired, he moves the lever to the rear of the quadrant and the whistle blows as long as the lever is in this position. In case he desires to blow a continuous long blast, the lever is placed on the notch indicated on the quadrant and the whistle blows until the lever is moved. In cases of emergency, the

Multiple Throttle Located in Superheater Header

A MULTIPLE throttle located in the superheater header is being exhibited for the first time by the American Throttle Company, Inc., 17 East Forty-second street, New York. This apparatus consists of a standard header, of either the Type E or Type A design, with which is cast integrally an additional part on the forward side of the header which contains the throttle



Sectional Illustration of the Combination Multiple Throttle and Superheater Header

valves and mechanism. In practically every case this combination can be installed in a locomotive now equipped with the normal through-bolt type header. Applications

to existing locomotives now equipped with through-bolt headers can be made without making any new steam pipes.

The valves are of comparatively small diameter—approximately 4½ in. They are very similar in construction to automobile engine valve, and are easy to keep tight.

The valves are operated by a cam shaft, also similar to that used on an automobile engine. They are so nearly balanced that only a minimum amount of effort is needed to move them. This balancing is accomplished by providing a small pilot valve, which opens first and which admits steam to the balancing chamber preliminary to opening the main valves. The main valves follow in succession, the first to open being the center valve; second, the end valve on the right side, etc., so that the passage of steam through the superheater and throttle is uniform, providing a perfect graduation in the supply of steam to the locomotive cylinders.

Owing to the type of construction necessary with the large throttle valve, it is usually found impossible, after a year or more of service, to keep it absolutely tight. The small size valve is not so affected by the high temperatures as is the larger valve. There are no bolts, pins, rods, links, or parts to become loose and cause trouble. The throttle valves respond perfectly to the control from the cab.

The valves are easily accessible and in case it should be necessary to do any work on them, they may be reached through the top of the smokebox by providing a removable cap directly over the header, without having to enter the front end. In cases where the locomotive is equipped with outside steam pipe and a shutoff valve, the throttle valve may be worked on at times when there is steam on the boiler. The throttle shaft stuffing box can be packed while there is steam on the boiler.

The number of joints in the front end are reduced to a minimum. This combination of multiple throttle and superheater header requires only the usual steam pipes leading from the header to the main engine cylinders, with joints between the steam pipes from the header in the smokebox. The additional weight of the header and throttle combined, over the header without the throttle is approximately 400 lb.

The operating lever is located in the cab the same as the present equipment for operating any outside throttle. The first movement of the lever opens the pilot valve and permits steam from the steam compartment to enter the balancing chamber, building up pressure under the balancing piston equal to that in the steam compartment. Further movement of the lever opens the first valve. The cams on the operating shaft are so spaced that when the first valve has partially opened, the second valve starts to open, and so on until all of the valves have opened when the throttle lever is in the full position.

The closing takes place in the reverse order; the valve which opened last, closes first and each valve successively, until all the valves are closed. The balancing valve is the last valve to close. The small amount of steam remaining in the balancing chamber leaks by the balancing piston and out through the steam pipes until the same pressure which exists in the steam pipes remains in the balancing chamber. The balancing pistons are made an easy fit in the cylinders to permit the pressure remaining in the balancing chamber to leak off when the throttle is closed.

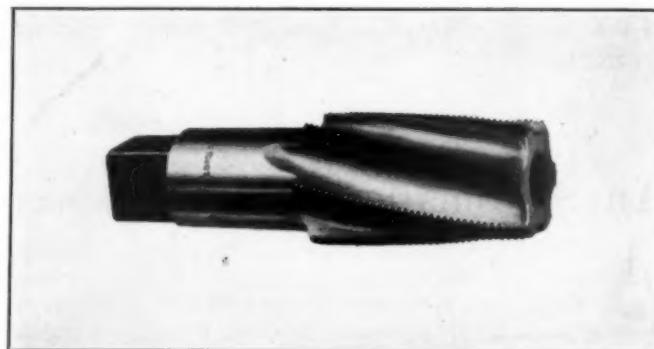
The closing is accomplished by the weight of the valve plus the blast action of the steam passing between the valve and the seat.

The only maintenance required for the throttle is that of keeping the stuffing box on the operating shaft packed and the grinding of the throttle valves.

Flexible Staybolt Tap

A NEW design of a flexible staybolt tap, the purpose of which is to reduce to a minimum the work required in tapping holes for flexible staybolts has been placed on the market by the W. L. Brubaker & Bros. Co., Millersburg, Pa., and is included in this company's exhibit. This tool is constructed with a special right-hand spiral flute.

Experiments were conducted to determine just what degree of angle the spiral should be so as to give the tool the proper cutting qualities. The spiral of the flute used on this tool eliminates hard cutting owing to the taper on the flexible staybolt taps. It also was found that the life



Flexible Staybolt Tap Designed with a Special Right-Hand Spiral Flute

of the tool was increased considerably over the straight fluted designs which this company has previously placed on the market.

These taps are made in all sizes and tapers and are furnished with pilots on the ends for securing pipes or attaching other types of guides to the tool. It can also be supplied with tapped holes in which pilots can be screwed into the tool.

Reamers are also furnished for this style of tap and are made to conform with the tap.

German Tests Show Effect of Boiler Circulation

A LARGE blue print is on display at the booth of the Locomotive Firebox Company illustrating the accuracy of German engineering observations, in a test to determine boiler performance. A German State Railway Consolidation type locomotive was equipped with Nicholson Thermic Syphons and was then subjected to standing tests at high and normal firing rates. Seven thermometers were used to take the temperatures at various points in the boiler, to observe water, steam and front-end gas temperatures.

Gas analyses are shown, as taken by two sets of apparatus to check each other. The evaporation per units of fuel and of total heating surface are graphically shown together with complete record of the various temperatures throughout the boiler. The original German diagram lines are reproduced, using the units of centigrade temperature scale, the metric scales of weights, and atmospheres for pressures, all of which have been translated to the English units, for more ready comparison, which no doubt will be made with available records of our own railroads.

The results of two and three-hour tests show differences

in temperature between the hottest and coldest waters in the boiler ranging only from 5 to 15 deg. F. Two of the tests were at very high rates of firing and evaporation, maintaining an average of 700 deg. F. total steam temperatures, the average pressure being about 208 lb.

The evaporation rates ran from 11 to 16 lb. of water per sq. ft. of total heating surface per hour, the minimum figure representing about a normal average working rate and the maximum nearly 50 per cent in excess of such a rate.

Ashton Two-Needle Steam Gage

THE No. 62 B. B. style locomotive master pilot gage which is being exhibited by the Ashton Valve Company, 179 First street, Cambridge, Boston, Mass., is constructed with a special dial with two circles



The Ashton Duplex Master Pilot Steam Gage

of pressure graduations. The outer circle is graduated only through the pressures from 190 to 210 lb. which permits of wide coarse graduations in one pound incre-

ments which are approximately $\frac{3}{4}$ in. apart with the figures for the working pressure at 200 lb. at the top of the dial in vertical position. The inner circle is graduated through the full range of pressure from zero to 400 lb. With the wide coarse graduations on the outer circle of the dial, the enginemen may easily detect the slightest fluctuations within the range of the working pressure and check the advancing steam, preventing waste through the safety valves, or the decline of the pressure below an efficient and economical operating point. It is particularly adapted for stoker-fired and fuel oil-burning locomotives.

While the illustration shows a dial for 200 lb. working pressure, the gage can be furnished for other working pressures, it being the standard practice to graduate the outer dial through a range of 10 or 20 lb. above and below the working pressure which, predetermined, should be at the top of the dial in a vertical position.

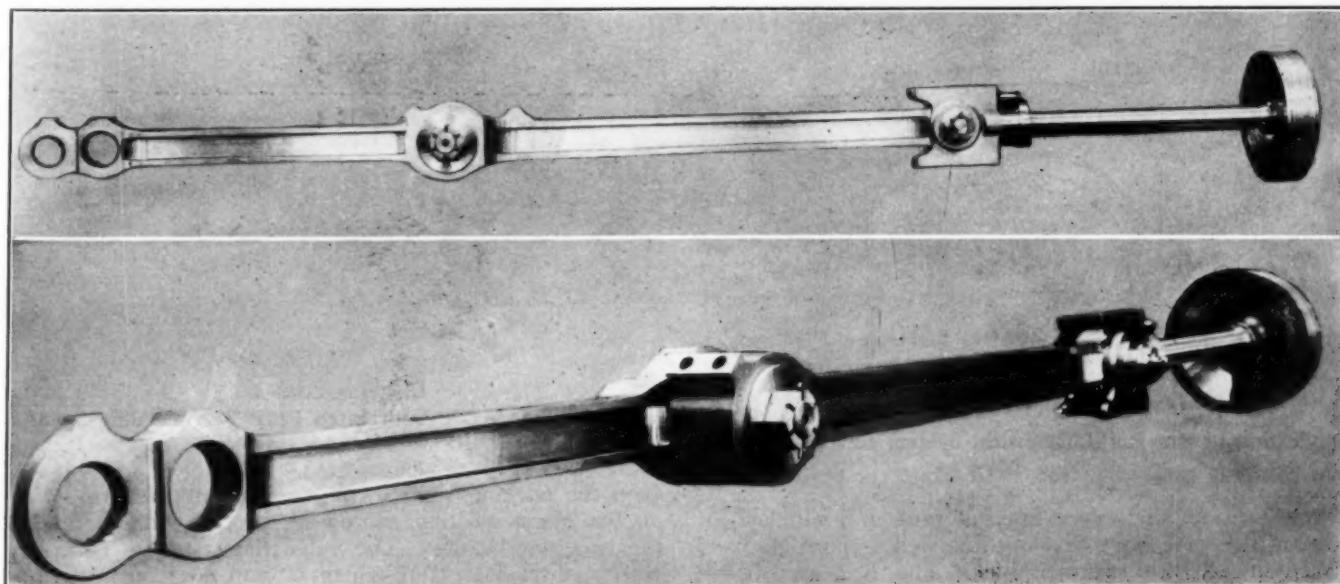
The gage is made only in the $6\frac{3}{4}$ -in dial size, in either an iron or brass case with threaded brass rings. It has the same dimensions as the Ashton standard $6\frac{3}{4}$ -in. locomotive steam gage with the exception that the case is a trifle deeper, and it may, therefore, be applied in place of the $6\frac{3}{4}$ -in standard locomotive steam gage, without the necessity of changes.

Ascoloy-Chromium Iron

DRIVING rod assembly made of Ascoloy, a chromium-iron electric furnace product, is being exhibited by the Allegheny Steel Company, Braddock, Pa. Ascoloy is a commercially pure chromium iron having carbon below .12 per cent with 12 to 16 per cent chromium. A typical analysis of this iron is as follows:

Contents	Per cent
Carbon, under	.12
Manganese	.50
Phosphorus	.025
Sulphur	.025
Silicic	.50
Chromium	12. to 16

The physical characteristics cover a wide range, depending on the heat treatment given where the tensile strength will vary from 72,000 lb. per sq. in. to 200,000



Locomotive Driving Rods Made of Ascoloy Iron

lb. per sq. in. with a remarkable percentage of elongation and reduction of area.

The fatigue value of Ascoloy is particularly adaptable for application to such parts as piston rods, main rods, side rods, crosshead keys and pins, main wrist pins, etc. It is claimed that Ascoloy has a greater resistance to fatigue than other high quality alloy steels. It is a suitable material for firebox sheets, flue and crown sheets, staybolts, boiler tubes, etc., due to its resistance to corrosion and pitting. It has a high resistance to the corrosive action of alkaline solutions and mine waters and also to galvanic action.

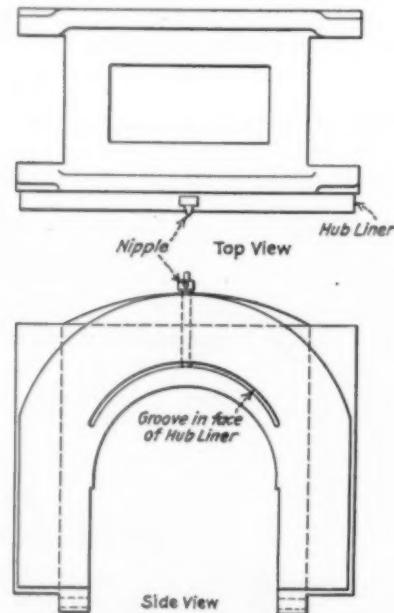
This alloy combines a high resistance to corrosion with high temperature, abrasion and fatigue resistance qualities. It is claimed to be more resistant to the corrosive action of salt water than is either steel or copper. The immersion of these materials for 200 hours in an aerated five per cent sodium chloride solution, gave the following losses in weight:

Ascoloy	.0031 grains per sq. in. or .037 per cent
Copper	.0629 grains per sq. in. or .950 per cent
Steel	Complete corrosion

Ascoloy is malleable and ductile and may be stamped, deep drawn, spun, formed, or double seamed. It is readily machineable and may be welded, soldered or brazed. It can be furnished in such forms as plates, billets, rounds, squares, octagons, hexagons, forgings, tubes, rivets, bolts, nuts, castings and special shapes.

Dot High Pressure Lubricator

IN the exhibit of the Carr Fastener Company, 31 Ames street, Cambridge, Mass., is included the Dot lubricating system which has been developed for a number of railroad lubricating requirements. This system of lubrication forces grease under pressure through a nipple, an application of which is shown in the drawing.



Application of the Dot Lubricating System to a Locomotive Hub Liner

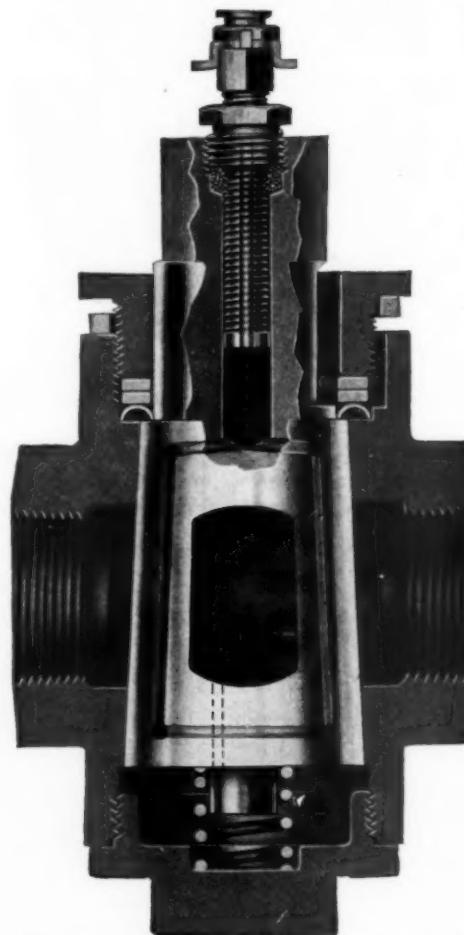
to the bearing surfaces. Special guns and nipples for railroad use have been developed as well as portable hand and motor driven supply tanks. The R-2 gun has a capacity of approximately 1 lb. of grease and the nipples used with this gun are of sturdy construction. These

parts are not interchangeable with automobile equipment and the guns can not be used for any other purpose than that intended. The Dot high-pressure lubricator is now being used on both steam and electric locomotives and gasoline-rail cars. The points of installation are driving wheels, valve motion work, eccentric rods, expansion pads, flue blowers, headlight generators, air brake lever arms, crosshead guides, hub liners, air reverse gear, crank pin bearings, stokers, chafing irons, bells, and main rod and side rod crank pin bearings.

This lubricator handles all kinds of lubricants from kerosene to hard cup grease. A pressure of approximately 3,000 lb. can be developed with one hand operation.

Changes in Lubricated Plug Valve

A MODIFIED form of valve plug, which has been previously described on page 1415 in the June 11, 1924, *Daily Railway Age*, is being exhibited by the Barco Manufacturing Company, 1815 Winnemac avenue, Chicago. The top gland of the original valve was held in place by two bolts. It was found difficult to



Barco Type AC 1 Lubricated Plug Valve which Opens Fully with One-Quarter Turn

keep the packing tight owing to uneven pressure set up on the gland packing caused by not drawing up evenly the two gland bolts. The valve illustrated is furnished with a threaded gland which is said to have overcome this trouble.

The gasket ring used in the previous valve was of the

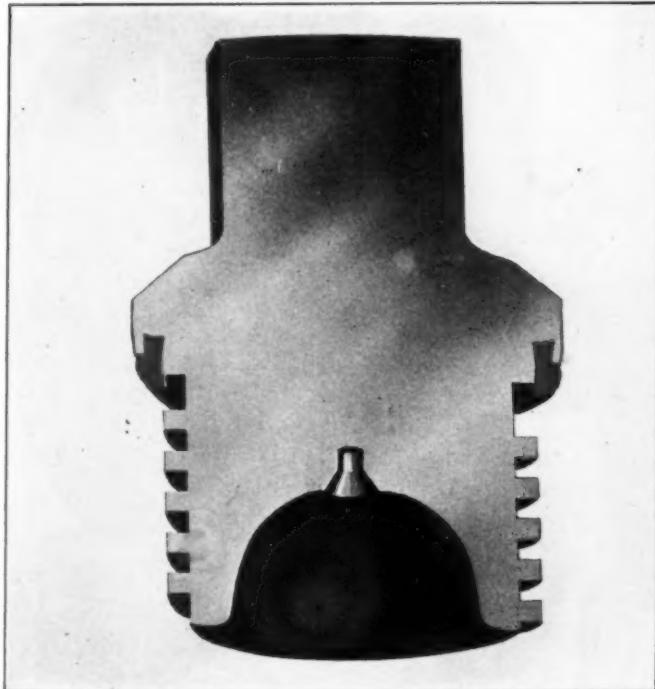
hydraulic molded type. This has been replaced by a metallic gasket semi-circular in cross-section. The lubricating grooves of the plug now pass around all four sides of the valve opening instead of around only three sides as was the case in the previous valves. The grease is forced through the grooves by means of a lubricator provided in the plug which prevents the escape of the grease.

The Type AC 1, which is illustrated, will carry the following pressures: Steam, 150 lb.; water, 300 lb.; air, 150 lb. The temperature must not exceed 400 deg. F.

Washout Plug With Square Thread

THE Huron Manufacturing Company, Detroit, Michigan, is exhibiting a type of washout plug and arch tube plug recently developed, which consists essentially of two parts—a plug with square threads and a bushing which has standard boiler threads on the outside and is tapped with square threads on the inside to receive the plug. The bushings are made with either round or hexagon bodies and the plugs may be had with either a square head or the recessed style. A permanent copper ball joint is fitted to the plug which, with the 45-deg. seat on the bushing, provides the steam tight joint. The washout plug bushings are made with a 2-in. daylight opening. The outside diameter is 3 in. threaded to fit the boiler.

The arch tube plugs are made in three sizes, for 3-in.,



The Plugs have a Copper Joint Ring Insert and Are Interchangeable

3½-in. and 4-in. arch tubes—with 2½-in., 3½-in. and 3½-in daylight openings. The inner plug with the square threads is made to a standard diameter so that it is interchangeable with any bushing designed to be used with this plug.

The square thread cannot readily be cross-threaded or improperly applied and no skill is required to remove or

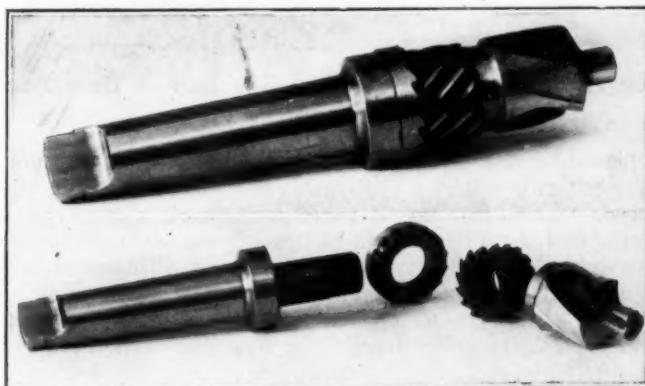


View of the Bushing Showing the Square Threads and Bevel Joint

insert the plug. The coarse threads tend to minimize the possibility of plugs being difficult to remove.

Tool to Drill, Ream and Countersink Flue Sheets

A TOOL designed to drill, ream and countersink flue sheets is being exhibited by W. L. Brubaker & Bros Company, Millersburg, Pa. It is made so that, if in the course of operation any of the parts wear out, they can be replaced, as all the parts are made up to a master and are interchangeable. This tool takes the



Brubaker Combination Drill, Reamer and Countersink

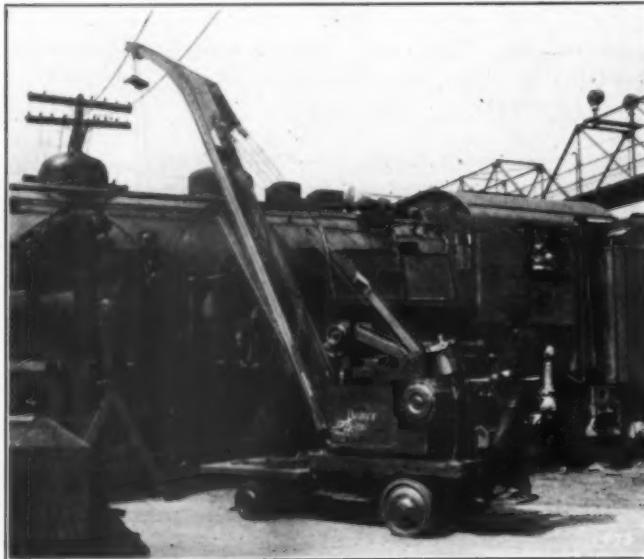
place of separate tools for three operations that are necessary to cut a hole in the flue sheet and does it all in one operation. It can be furnished in any size desired and in any style shank.

After once getting the complete tool, it is only necessary to replace the cutting parts, as the shank should last for years.

Crane Handles Difficult Job in Short Time

AMONG other machines being exhibited by the Baker-Raulang Company, Cleveland, Ohio, is the Baker portable locomotive type crane which was used to handle the job shown in the illustration. The portable crane shown is in the service of one of the railroads in the Chicago district and on this particular job the enginehouse foreman was obliged to make a quick change of air pumps on a locomotive—the situation requiring that the pump be changed in 45 minutes, if at all possible. It happened in this particular case that the way into the enginehouse was blocked and it would have taken more than an hour to have cleared a stall and put the locomotive in place in the house. However, the enginehouse foreman had the locomotive stopped in the yard across a concrete roadway, the crane truck brought a new pump directly to the locomotive and the complete change is said to have been made in 36 minutes.

The crane shown in the illustration is essentially the same as the one described on page 188 of the *Railway Mechanical Engineer* for March, 1924. However, the cone type magnetic brakes on the earlier model have been



The Air Pump on this Locomotive is Said to Have Been Changed in 36 Minutes

replaced by disc brakes in which a single steel disc rotates between two stationary plates faced with a friction material. The hoist consists of two drums driven by a single motor. The drive is by means of a worm reduction through a standard type of bevel gear differential and thence through two planetary spur gear reductions to each of the drums. Normally both disc brakes are set, which prevents either drum from rotating. When current is applied to the hoisting motor one of the disc brakes is released with the result that the hoisting drum on that side revolves. The operator selects the brake to be released by moving a switch conveniently located on the dash of the truck. This method of drive eliminates the shifting of gears or dog clutches. The controls may all be mounted on the dash and do not follow around with the crane superstructure when the boom is slewed.

Another interesting development is the auxiliary boom which is shown in the photograph drawn up alongside of the main boom. The auxiliary boom is used for working underneath the running board of a locomotive. To use

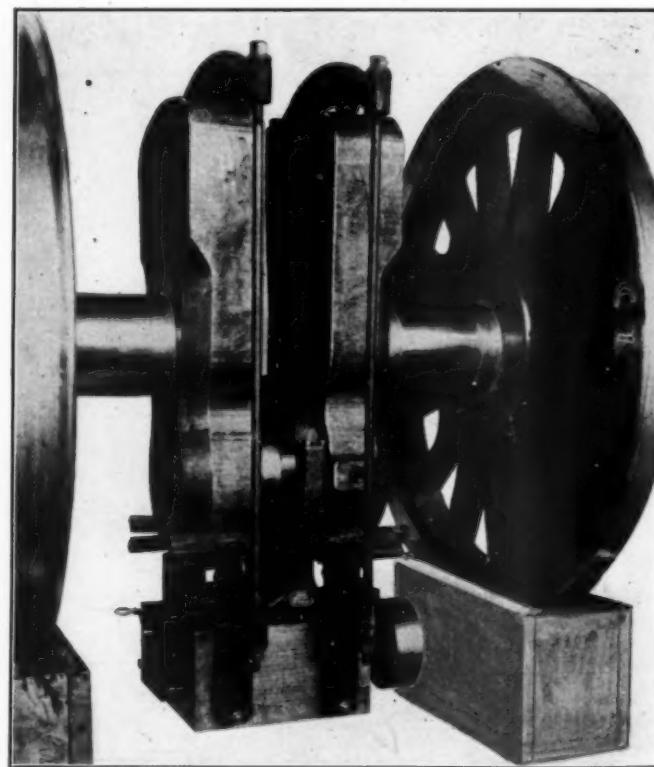
it the sheave hook is passed through an eye about two feet back from the outer end of the auxiliary boom. An auxiliary hook is provided at the end of the boom and this device permits the crane to handle side rods and other parts which must be applied underneath the running board.

These cranes are also supplied with telescoping booms (not shown in the photograph). Such booms may be made to telescope between any reasonable limits but the most popular is the boom which is adjustable between 15 and 19 feet. The 15-ft. length of boom is suitable for locomotive trimming work and is even long enough to place the locomotive side rods on top of the tender, as is done when it is necessary to tow a locomotive over the road for long distances. When the boom is extended to its full 19-ft. length it will reach over the top of the boiler and may be used for handling such parts as headlight generators, steel domes, front doors, etc.

Worm-Driven Center Crank Pin Turning Machine

A CRANK pin turning machine specially designed for truing up the center crank pin on three-cylinder locomotives in position without taking the crank shaft out of the pedestals, is being exhibited this year by the H. B. Underwood Corporation, 1025 Hamilton street, Philadelphia, Pa.

The method of setting up the machine is rendered simple and eliminates any question of alignment.



A Portable Machine for Turning the Center Crank Pins on Three-Cylinder Locomotives

ment. It is only necessary to put the hardened steel centers of the machine in the original centers of the crank pin and set up on the four set screws in the brackets on the beds of the machine to prevent any oscillation. The machine is then ready to operate.

When turning up a center crank pin, the cutter head is run to one end of the pin until it just clears the inside face of the crank web. The cutting tool is placed in the tool holder on the opposite side of the revolving cutterhead. It is then set to the proper depth, the feed thrown in and the cut taken to the end of the pin. The tool is then placed on the opposite side of the cutterhead and the cut is then picked up and continued to the opposite end of the pin. The tool is adjusted by means of a screw at the back. This screw is reached through slots in the cutter head housing and a fine adjustment can be quickly made. The adjusting screw also acts as a stop to prevent the tool from slipping.

The feed is reversible and variable and is operated by means of levers and gears on the end of the bed. The machine is provided with two feeds and a change from one to the other is quickly made.

The cutterhead is made in halves, tongued, grooved and bolted together by means of four body fitting screws. The housing, in which the cutterhead revolves, is also held together by means of four body fitting bolts, which, in both cases, keep the cutter head and housing in perfect alignment.

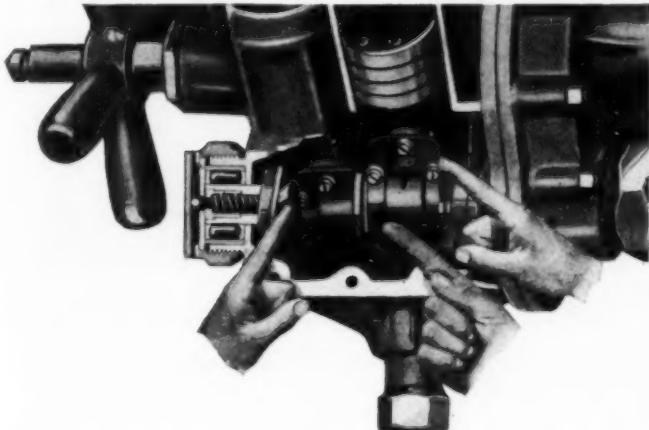
The machine is worm driven, which insures a straight, round and smooth pin. It may be driven by means of an air or electric motor or by a motor connected to a pulley on the drive shaft with a belt. It is designed to turn pins from 7 in. to 12 in. in diameter and from 6½ in. to 8 in. long.

The strong backs and long bolts shown in the illustration are for holding the machine in position when it is impossible to use the centers and they are not regularly furnished with the machine.

Throttle and Vent for Thor Air Drill

TWO refinements in design have been incorporated recently in the Thor portable pneumatic drills, made by the Independent Pneumatic Tool Company, Chicago. They include a throttle and a venting device, both of which are illustrated.

The new throttle is reversible, with a large valve giving



Hands Point to Location of Vents in New Thor Air Drill Construction

ample ports and a long bearing for easy operation. Bronze construction is incorporated to prevent corrosion and sticking, and ribs give added strength to the handle, preventing indentation with proper handling. A light

spring holds the valve air-tight against the long taper seat, and an adjustable collar takes the valve thrust, preventing undue wear on the seat.

The venting device, shown in the larger of the two illustrations, is said to be the only positive venting structure that actually separates air from grease, allowing the

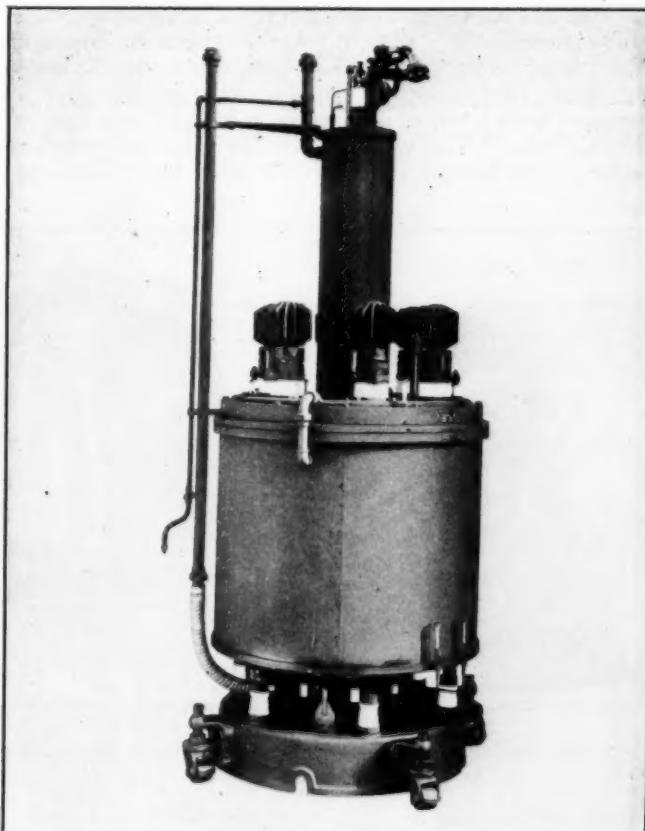


The New Reversible Throttle for Thor Air Drills

air to pass out of the crank case while throwing the grease back onto the moving parts. Being of separator design and on the upper crank arm, it induces a circulation of lubricant from the lower crank case to the upper bearings, by the air current. Vented cranks can be supplied on part orders for motors now in service.

Mercury-Arc Power Rectifier

THE American Brown Boveri Electric Corporation, 165 Broadway, New York, is exhibiting a large mercury-arc power rectifier which can be used for the same class of service as that for which motor-generator sets or rotary converters are employed. The basic



Mercury-Arc Power Rectifier which may be Obtained in Capacities up to 3,000 kw. at 4,000 Volts d.c.

principle is identical with the familiar mercury-arc glass enclosed rectifier used in rectifying alternating current at house lighting voltages for charging storage batteries.

The power rectifiers may be secured in capacities up to 3,000 kw. at 4,000 volts d.c. There are now in successful operation rectifiers of this type having a total capacity of 350,000 kw.

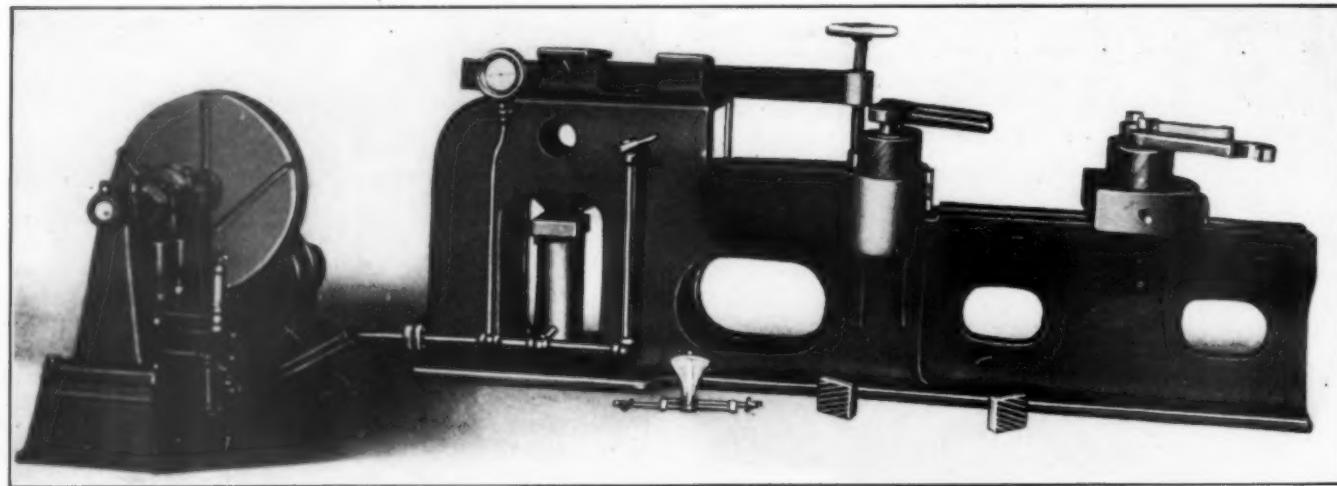
Advantages in both maintenance economy and power efficiency are afforded. An efficiency curve which remains high even at low load values characterizes these devices. Absence of rotating parts eliminates the inherent drawbacks of machinery possessing such parts and creates a quick adaptability to sharply varying loads. Rectifiers may be used in parallel with other types of conversion equipment with the advantage of requiring no synchronizing. Hum and vibration is also eliminated.

The starting and stopping operations may be controlled automatically by the function of the load, by a clock, by a remote control, or by a combination of the above conditions. Rectifier substations are fully protected against overloads and short circuits by time-reset relays.

Adjusting Machine for the Blacksmith Shop

THE Watson-Stillman Company, 50 Church street, New York, is exhibiting the Walter Stock adjusting machine, which is designed for use in the blacksmith and forge shops for lengthening, shortening or straightening locomotive parts. The illustration shows the machine equipped with a Watson-Stillman vertical two-plunger pump with motor drive. The frame of the machine has been redesigned and made somewhat heavier.

The machine is made of steel throughout, consisting of a frame, two-toggle links, a ram, a filler block, a sliding block, four eccentric gripping cams, a clamping bar complete with a wheel and screw, a wedge block and two binding links. The toggle links and ram are joined together. The end of the rear link rests in a recess pro-



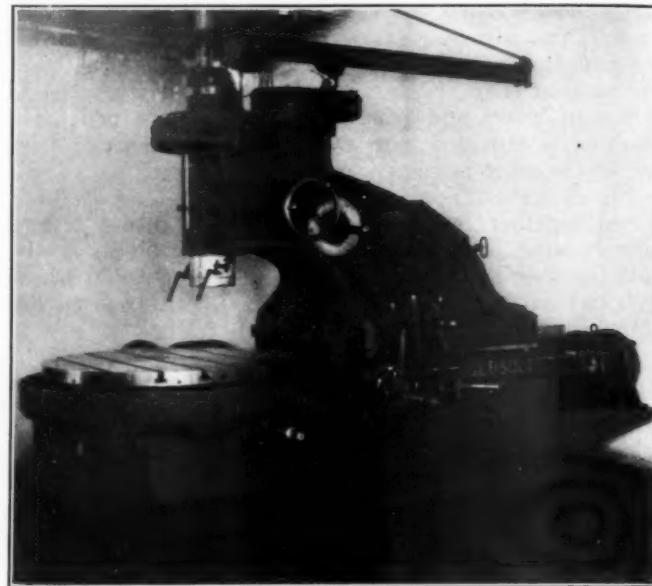
The Adjusting Machine is Driven by a Watson-Stillman Vertical Two-Plunger Pump with Motor Drive

vided in the frame and is held in position with a pin. In operation there is no pressure exerted on any of the pins joining the links and the ram.

Provision is made in the frame for the reception of the filler block, the sliding block and two of the cams. Recesses are provided in the frame for reception of the wedge block. A pad is provided on the rear end of the frame for attaching an overhead crane if desired.

Adjustable Rotary Milling Machine

THE Ingersoll Milling Machine Company, Rockford, Ill., is exhibiting a 54-in. adjustable rotary milling machine for trepanning locomotive rods. The spindle housing has a feed and adjustment forward and back



Ingersoll 54-Inch Adjustable Milling Machine for Trepanning Locomotive Rods

while the table slides on ways at right angles. The circular table rotates in the table slide, or may be locked when desired. These movements, with the 18-in. boring feed

in the spindle, give a versatility which adapts it to many operations found in locomotive shops. The machine has sufficient power and weight for heavy work in alloy steel.

The Ingersoll trepanning cutters used on this machine are made in several sizes for trepanning the ends of different size rods.

Two-Motor Turntable Control

THE Westinghouse Electric & Mfg. Co. is exhibiting a duplex controlling arrangement for turntable service. Two motors are used, one at either end of the turntable, both of which are controlled simultaneously from a single drum controller. A turn of the handle, and both motors are started, and both run at the same speed. Westinghouse CI motors are features of this equipment. These are of sturdy construction, such as is demanded by railroad service. They are totally enclosed and are equipped with the latest type of sealed sleeve bearings.

The motors have type AI magnetic brakes. Features of this brake are: self-aligning brake shoes, ease of adjustment, and the small diameter of brake wheel required. The use of this brake makes it easy for the operator to spot the turntable; since there is practically no drift after the power is shut off.

Racine Junior Metal Cutting Saw

A 4½-in. by 4½-in. capacity metal cutting saw is included in the exhibit of the Racine Tool & Machine Company, Racine, Wis. It may be furnished with either a belt or motor drive. The mechanical lifting device lifts the saw blade clear of the work on the non-cutting stroke, thus eliminating back drag on the teeth no matter how great the pressure on the blade. The pressure is exerted on the hack saw blade by gravity.

All the parts of the machine are interchangeable and adjustable. The frame slides on steel gibs and has an



Racine Junior Motor Driven Metal Cutting Saw

adjustment for wear. The mechanical lifting device can be adjusted for lifting the blade on the forward stroke. The blade holder is adjustable for 10-in. or 12-in. blades. The frame mounted on the square slide has a wide bearing immediately over the stop.

The machine operates from 80 to 100 r.p.m. at a full 6-in. stroke. The height to the top of the table is 20 in. and the overall height is 28 in. It requires a standard 1,750 r.p.m. ¼-hp. motor to operate it and when belt driven, requires a 12-in. by 2-in. pulley. The machine requires a floor space of 38 in. by 12 in.

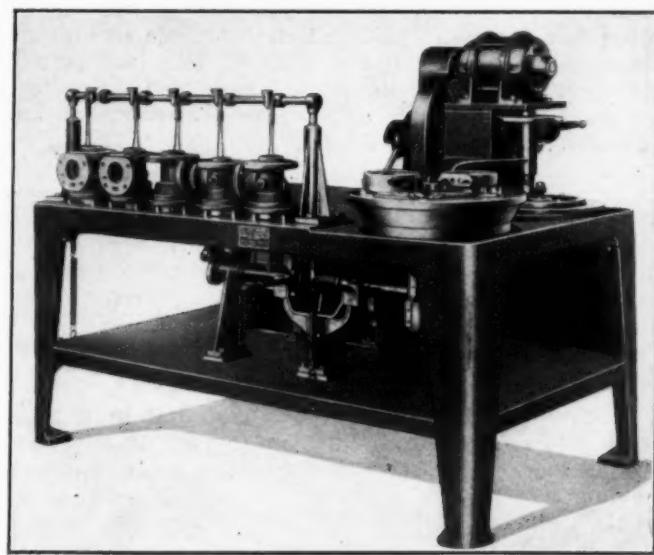
Semi-Automatic Valve Finishing Machines

TWO semi-automatic valve finishing machine are being exhibited by the Special Bolt Machinery Corporation, 50 Church street, New York. These machines are designed for the repairing of triple and other



Machine Equipped with the Rotary and Lap Plate Truing Device Only

control valves forming a part of the air brake equipment and to eliminate the hand operation of lapping the slide valve on its seat and producing a surface which will



Machine Equipped with the Lap Plate Truing Device and the Rotary and Reciprocating Sections Only

pass the prescribed tests. It has been the aim of the manufacturers to create a standard practice for this work, so that all seats shall be finished perfectly flat up to the

edges of all ports and may be paired at random one with another with the assurance that they will be tight. The machine shown in one of the illustrations is designed to handle five triple valves or a proportionate number of control or brake valves, etc., at one time.

The rotary section is used for refinishing all flat unrestricted surfaces and reconditioning the lapping sticks. The reciprocating section is for refinishing the internal seat for the slide valve of triple and similar valves, and the seat in the slide valve for the graduating valve. The cylinder grinding section is for the purpose of grinding bushings of cylinders of triple and other valves, the body being secured to the face plate or rotary table. The piston ring lapping section is for lapping or touching up the piston packing rings to a final fit in the brass cylinder bushings of the triple and similar valves, which eliminates the practice of hand rubbing. The machine equipped with the rotary and lap plate truing device only is for use where the system of operations require only the lapping of unrestricted flat surfaces and the truing of the lapping plates.

The main motor which provides power for all sections is mounted on the machine. The frame carrying the sections is of heavy construction. All sections are provided with cut-out clutches so that any one may be started or stopped without interfering with other operations.

Thor Ripping Chisel

A SPECIAL chisel for use in Thor rivet busters when ripping light sheet steel has been developed and, after a successful try-out, placed in quantity production by the Independent Pneumatic Tool Company, Chicago. The ordinary ripping chisel used by boilermakers and steel car workers consists of a plain chisel of rectangular cross section, square at the outer end. In cutting up old steel cars and similar work this type of chisel is difficult to guide, especially if the operator lacks experience, or the steel sheets are corroded so as to be thinner in some places than in others. The new ripping chisel has a guiding point which holds the tool to the sheet, promotes safer and more rapid work, and permits the operator to devote his entire attention to maintaining the correct general direction of the pneumatic tool and following the cutting line.



Ripping Chisel Designed for Use with Thor Rivet Buster

The ripping chisel cuts a groove from $3/16$ in. to $1/4$ in. wide in the sheet steel, the cutting part of the chisel having sufficient clearance at the cutting point to prevent binding action. The projection or guiding point, shown at the right in the illustration, acts to keep the chisel in proper relation to the sheet being cut. It increases in width towards the chisel body proper, stiffening and strengthening the portion of the chisel devoted to cutting. This tool has been demonstrated on material from $1/4$ in. to $3/8$ in. thick but should generally be used in thinner sheets, on which it is said to show a saving over electrode or gas torch cutting methods. In one railroad shop where

a 50-ton hopper car was being scrapped a cut 11 ft. 6 in. in length was made in 3 min. 20 sec., the same average time being maintained on the whole car side.

One Man Ratchet Lever Jacks

AMONG the products exhibited by the Joyce-Cridland Company, Dayton, Ohio, will be found new ratchet lever jacks especially designed for use around car repair yards. These jacks are of two types—one a geared type for heavy loaded car work, and the other an improved ratchet lever type for empty-car service and lighter duty in general.

The geared jack, known as No. 400-A, which is illustrated, is similar in principle to the old No. 400 jack, but is approximately 50 lb. lighter and so much more powerful that one man on the end of the lever can lift his share of the load without undue exertion.

The empty-car jack not shown, is designated as No. 2028. While it is rated at 20 tons' capacity, it weighs scarcely more than some 15-ton jacks of the ratchet lever type. By the use of lighter and stronger materials, however, the weight has been kept within practicable limits.



The No. 400-A Jack, Especially Designed for Loaded Car Work

and, at the same time, the efficiency increased to the point where the jack will do the work of the heavier geared lever and screw jacks commonly used for empty car repair.

The new jacks are built without machine screws, eliminating to a great extent the possibility of parts working loose or becoming lost. They are equipped with steel operating levers which will bend when the capacity of the jack is reached, automatically preventing overloading and consequent breakage. Furthermore, the elimination of the wood lever which frequently splits or breaks removes a cause of accidents.

Hercules Rotary Air Drill

AMONG the exhibits of the Buckeye Portable Tool Company, Dayton, Ohio, will be found the Hercules No. 0 rotary pneumatic drill which has recently been added to the line of air tools manufactured by this company. This drill is similar to the other tools in its principle of operation. The motor is of the rotary type in which only four moving parts are used. One of these is a concentric rotor mounted on ball bearings, and the other three are blades set radially into the rotor, and capable of a slight radial movement. These blades receive the power impulses and transmit them to the rotor. Ports are used to distribute the air and are so arranged that they allow each blade to receive two power impulses for each revolution, which results in a smooth flow of power and a noticeable lack of vibration.

The cycle of operations is as follows: Compressed air entering the motor through a central shaft passes through the open port, and exerts pressure against the back of one of these blades. At the same time, pressure is also exerted against the bottom of the blade, causing the latter



The Drill Working on $\frac{1}{16}$ -in. Holes in $\frac{1}{2}$ -in. Boiler Plate

to move slightly outward in its radial slot, establishing secure contact between the top of the blade and the cylinder wall. Then after the blade has been pushed around about one-third of its stroke under line pressure, the port closes and a long expansion stroke takes place after which a quick cut-off and exhaust into atmosphere occurs. This cycle takes place during one-half a revolution of the rotor, and is then repeated on the same blade during the second half of the revolution, thereby completing two cycles of events in 360 deg. of rotor movement. The three blades receive a total of six power impulses per revolution.

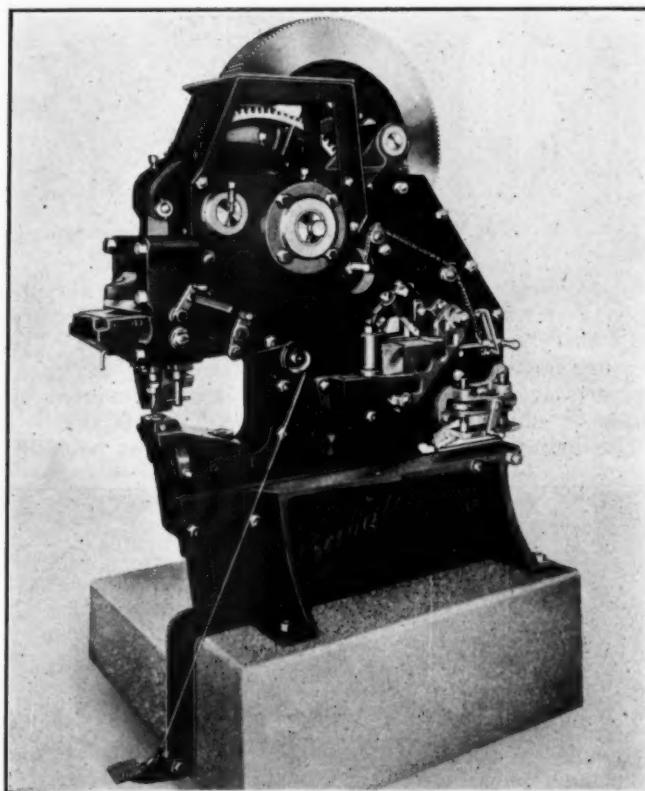
The parts that require replacement in the motor are the three rotor blades. The blades are inexpensive and can be changed in a few minutes. It is said that in addition to low cost of operation, this tool is economical in its use of air and develops a high torque.

The illustration shows the No. 0 drill being used on a job where it was necessary to drill 19,000 $3/16$ -in. holes in $\frac{1}{2}$ -in. boiler plate. A report on this job showed that it was possible to average 200 holes per hour during an

eight-hour day. The actual drilling time was from 10 to 12 seconds, depending on the condition of the drill. The additional time during the day was used for shifting plates, changing drills, etc.

Buffalo Iron Worker With Coper

AN ADDITION to the Buffalo-Armor-Plate line of punches, shears and bar-cutters is the new No. $\frac{1}{2}$ universal iron worker, with built-in coper, exhibited by the Buffalo Forge Company, Buffalo, N. Y. In shops where much coping work is done on angles, I-beams, tees, channels, zees, plates and flats, as well as other rolled shapes, the new machine will be particularly useful, as in addition to the coper, it has the regular punch, shear and bar cutter of the universal iron worker. The coper is built on the punch end of the machine, as shown in the illustration, being operated by the same plunger, and actuated by the same controls, either hand or foot. The foot control enables the operator to handle all kinds of punching and coping work and also makes



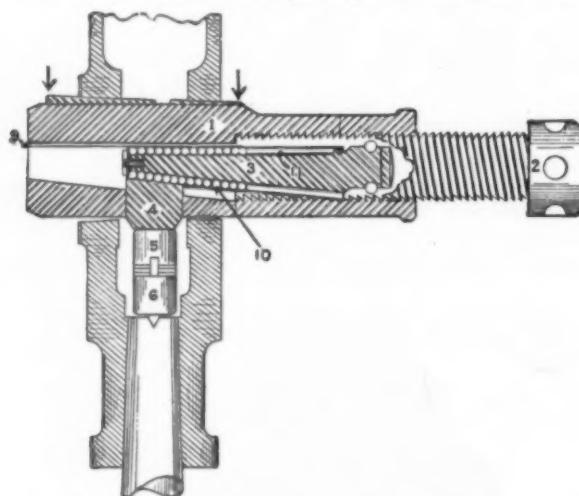
The Coper is Built on the Punch End of the Machine and is Operated by the Same Controls

it possible to operate the machine with both hands on the work. The specific advantage of the built-in coper is the fact that it is not necessary to interchange the coping tools with the standard punching tools. The coper, as described here, can also be supplied with other Buffalo Armor Plate punches. A sheet steel cover guard, not shown in the illustration, is provided to fit over the coper to protect the operator. The No. $\frac{1}{2}$ iron worker coper will handle 5-in. channels, 6-in. I-beams and 3-in. by 3-in. by $5/16$ -in. angles. The No. $1\frac{1}{2}$ takes 6-in. channels, 7-in. I-beams and 3-in. by 3-in. by $3/8$ -in. angles. One cut only is required for the full depth on all sections.

Smith Multiplex Pressure Jack

A JACK that can be used in a 2-in. to 5-in. space and which has a lifting capacity of from 25 to 100 tons is being exhibited by the Clark Manufacturing Company, 427 North Thirteenth street, Philadelphia, Pa. This jack, which is known as the Smith Multiplex pressure jack, is especially adaptable to the railway field and has been used with success in pulling pistons, loosening tight bolts, removing engine truck brasses, changing car and tender bearings and jacking up equalizers when applying or removing driving, trailer and truck springs.

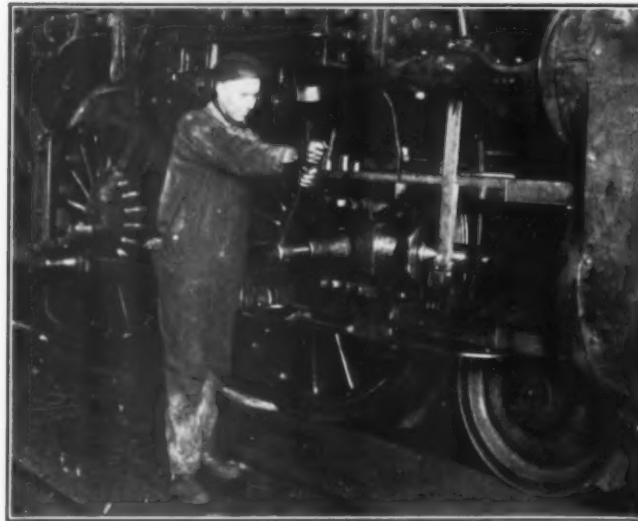
The cross-section of the jack shown in the illustration shows the construction and principle of the jack. It con-



Cross-Section View Showing the Construction and Principle of the Jack

sists of a cylinder which is threaded for the pressure screw. The screw is drawn up against the longitudinal and transverse wedge which runs on roller bearings. The pressure is transmitted through the transverse wedge to the parts against which the pressure is to be exerted by means of suitable filler piece.

The operation of the jack is simple and it can be easily



Using the Multiplex Jack for Separating a Crosshead and Piston

handled by one man. If the workman is going to force a piston from the crosshead, the jack is first placed in the wrist pin hole and the transverse wedge directed toward the end of the piston rod. The pressure screw is run

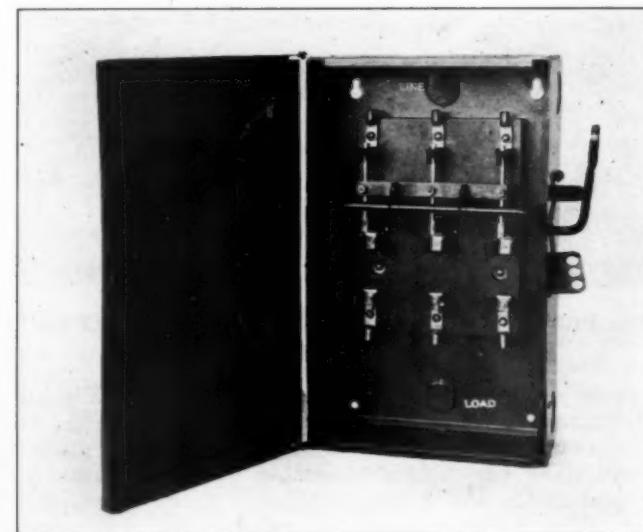
back by hand which also pulls back the longitudinal wedge. Before applying the pressure, a final check should be given to see that the filler pieces are properly in place between the end of the piston and the transverse wedge. As the pressure is exerted on the longitudinal and transverse wedges, the jack cylinder tightens in the wrist pin hole against the wedge-shape filler piece which is placed around the end of the jack.

The spring rigging and journal jacks are made in three different sizes. The spring rigging jack is 4 in. over all. It can be used in a 4-in. space, lifting 50 tons. The car and locomotive jacks are 5 3/4 in. over all and are furnished with filler blocks so that they can be used for all sizes of car wheels and journal boxes when removing journal brasses. There are six sizes of jacks ranging from 50 to 100 tons in capacity and weighing from 55 lb. to 100 lb. They vary only 2 in. in length, the smaller size being 21 in. long and the larger size 23 in. long.

A Quick-Break Industrial Switch

A QUICK-BREAK, safety, enclosed switch has recently been brought out by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. This switch, known as the Type WK-62, is externally operated, totally enclosed, and has a simply constructed quick-break mechanism. It is for industrial and other applications where a disconnect switch is desired.

The stops that limit the travel of the switch arm and



Interior of Box Showing Construction of Switch

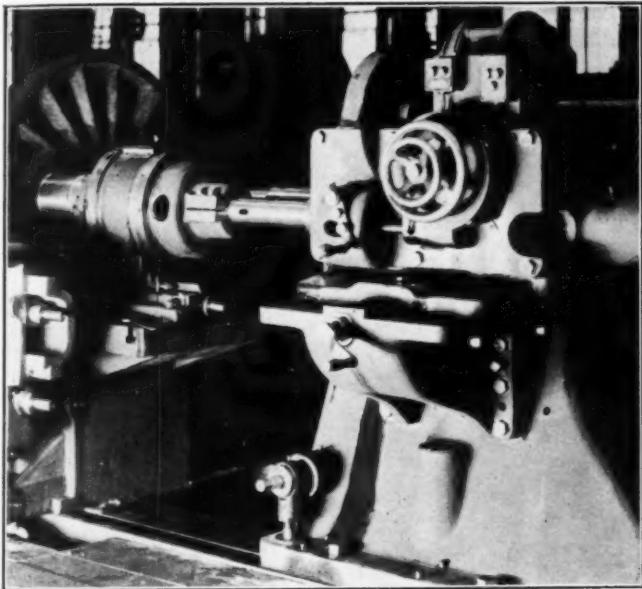
the blades are placed on the outside of the box, which simplifies the construction and affords ample room for wiring. Clean cut and easily removed knockouts are provided in the back, sides and the top and bottom ends for any desired arrangement of the conduit. The diamond pointed jaw and the extended blade are used in the WK-62 switch. With this feature, any burning that occurs when the switch is opened does not foul the current carrying area of the blades and break jaws.

The new switch is supplied in capacities from 30 to 200 amperes and is rated at 250 volts DC and 250-500 volts AC in both the fusible and non-fusible types.

Niles 90-in. Journal Turning Lathe

THE Niles-Bement-Pond Company, 111 Broadway, New York, is exhibiting a 90-in. journal turning lathe which can be furnished for turning inside journals, or for inside and outside journals, or for journal turning and single or double quartering. Mounting the wheels on dead centers and an adjustable counterbalance in the face plate are two features which have been recently incorporated in the machine.

To further assure accuracy of finish of journals, both

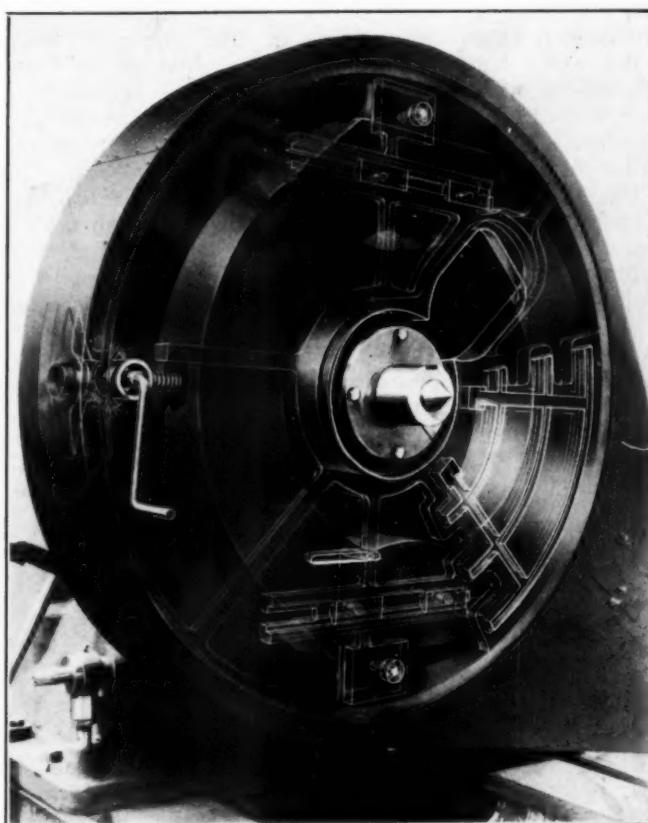


Crank Pin Turning Attachment in Place on the Niles 90-in. Journal

ends of the axle are carried on non-rotating or dead centers. The centers are carefully heat treated and are mounted in sliding spindles that can be clamped firmly in the headstock throughout the entire turning operation.

The heavy counterweights of the driving wheels exert considerable centrifugal force when revolving in a lathe for journal turning. As shown in the phantom view, the

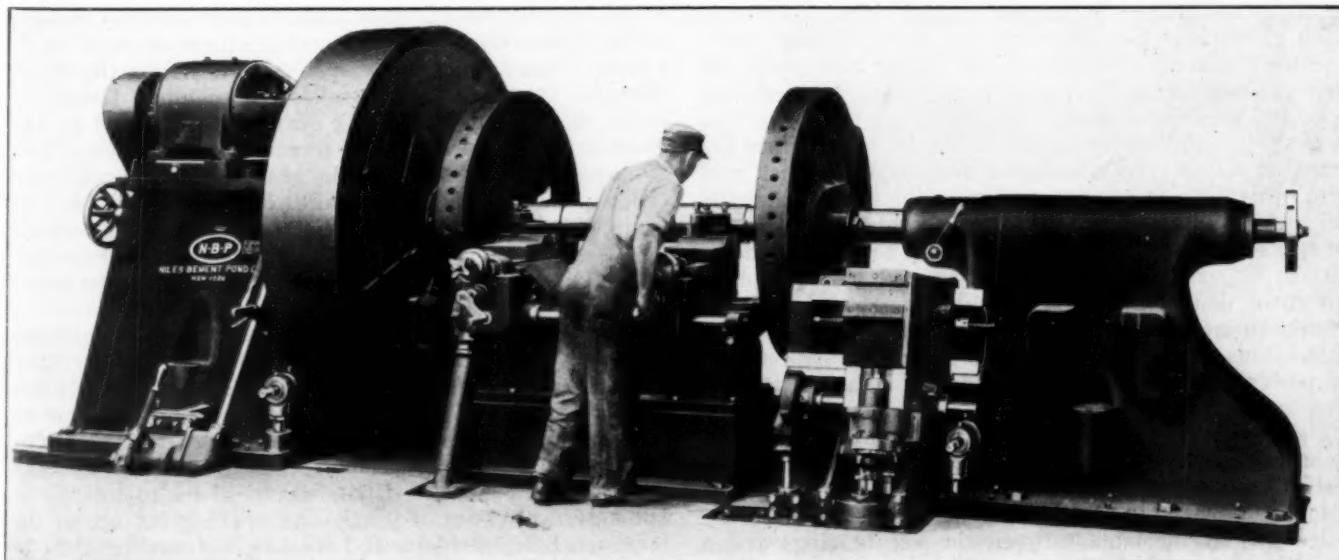
counterweight is located entirely within the face plate with no projections. The counterweight is a single casting, with one simple adjustment for different size wheel sets by simply turning a wrench on the square nut. The adjustment is through bevel gears and a screw. A pointer in a slot shows the position of the counterweight from zero to maximum counterweighting which is sufficient for the largest wheel sets. The counterweight is guided in



Phantom View of the Counterweighted Face Plate

T-slots and is held firmly in position by clamps operated by square head bolts.

The headstock and tailstock are both provided with power traverse along the bed by means of a separate



Turning a Pair of Inside Journals on the Niles 90-in. Journal Turning Lathe

5-hp. motor driving a revolving screw in the bed. Powerful eccentric clamping mechanisms operating at both the front and back of each member are provided for quickly clamping the head and tailstocks to the head.

The carriage consists of two compound tool rests mounted on a base bolted on the bed between the driving wheels. The rests are provided with power longitudinal feed for turning journals and power cross feed for facing hub liners. The feeds are reversible and the changes are obtained through a feed box located on the headstock. Provision is made for engaging or disengaging the feed at the rests. Hand adjustment also is provided for both longitudinal and cross travel. The rests are arranged to take burnishing rollers, which are furnished with the machine. An outside rest for turning the journals of trailer sets will be furnished if desired.

The rest is equipped with a pneumatic withdrawing mechanism so that it can be quickly lowered when not in use. The mechanism consists of an air cylinder, the piston rod of which is connected by a swivel joint to a projection on the rest. To swing the rest out of the way, it is only necessary to loosen the two holding down bolts on the rear of the rest. The air pressure is applied by means of the controlling valve and the rest is withdrawn to the vertical position.

The machine may be driven either by a 15-hp., 220-volt d.c. motor, 3 to 1 speed variation, or a 15-hp., 220-volt, 3-phase, 60-cycle constant speed motor, with a compensator.

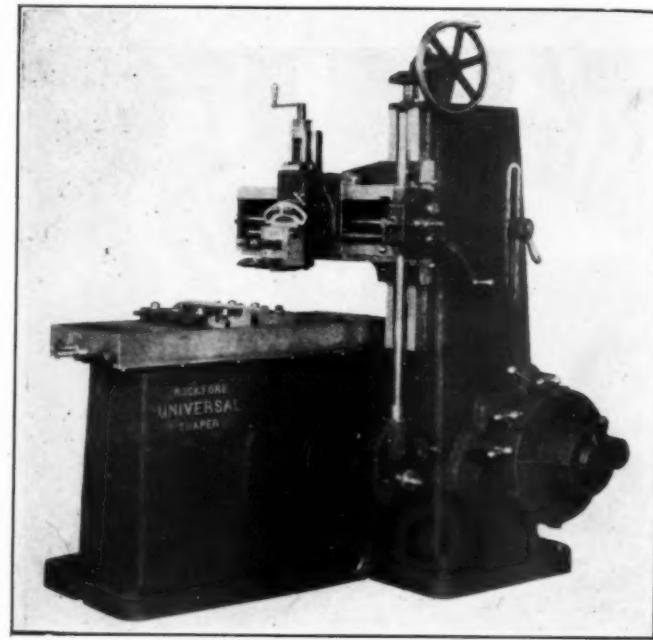
Rockford Universal Open-Side Shaper

THE Rockford Machine Tool Company, Rockford, Ill., is exhibiting an open-side shaper which is designed to handle jobs that cannot be performed advantageously on a planer or standard shaper. This machine is built in two sizes with 26-in. and 36-in. strokes, respectively, and is adapted for a wide range of operations where the size of the work to be handled brings it within the scope of one of these machines and where the accuracy demanded is such that the job would otherwise require the use of a planer. The design of the 36-in. machine follows that of the 26-in. size, except that the larger can be equipped with a side head. A feature of the 36-in. machine is the construction of the rocker arm which consists of two closed racks. One of these racks is secured to the under side of the shaper table, and the other is fixed in the body of the machine. Between the racks and meshing with both of them is a pinion carried on a shaft which is connected with the rocker arm by means of a link. As the rocker arm oscillates back and forth, this link imparts a reciprocating motion to the pinion shaft which causes the pinion to rotate. As one of the racks is fixed, this rotary movement of the pinion results in imparting to the other rack and to the table a movement double that which would be secured a direct connection of the link through the rocker arm to the table. This mechanism is also the means of stepping up the power so that the drive provided is sufficient for the most severe classes of service.

The same provision is made for positioning the stroke on both the 26-in. and 36-in. machines. This is accomplished by means of an adjusting screw at the end of the table. On the 26-in. machine, a block is secured to the under side of the table between the vee bearings and a tapered gear to which the power link is connected. The same method of securing the rack to the under side of the

table is used on the 36-in. machine. After releasing the block or the rack, the table can be adjusted to bring it to the required position and the block or the rack again secured to the table.

Provision is made for the efficient lubrication of the table vee bearings by means of a perforated oil tube which runs through the table over each bearing. Felt wipers are inserted in slots opposite the openings in the oil tube. As the table is moved back and forth, the surplus oil escapes through holes at the ends of the vees and drains into a reservoir in the base of the machine.



An Open-Side Shaper with Reciprocating Table

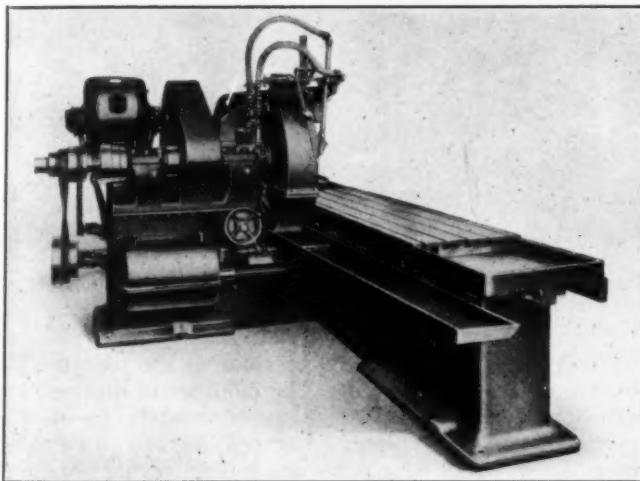
Oil cups of ample capacity are provided on the table. The machine is started and stopped by a friction clutch controlled by a lever which extends forward within easy reach of the operator. This lever is also connected to the brake in such a manner that when the clutch is released, the brake is engaged by the same lever movement, thus providing for instant stopping of the table traverse. Sliding gears mounted within the column provide for obtaining any one of eight different strokes per minute to the table. On the 26-in. machine these changes cover a range from 9 to 50 strokes per minute, and on the 36-in. machine, from 6½ to 33 strokes per minute. Referring to the illustration, the sliding gears are controlled by the three handles which can be seen near the housing containing the clutch and driving gear. These handles are pushed in or pulled out as required. Whatever pair of gears the operator desires to engage are located by means of a spring plunger which enters a pocket in the push rod. Only the one pair of gears for the required table speed are in operation at any one time.

The horizontal travel of the tool on the 26-in. machine is 23 in. and the vertical travel is 9 in. The working surface of the table is 18 in. by 32 in., and the table has an adjustment of 12 in. The height from the floor to the top of the table is 36 in. The machine is driven by a 7½-hp. motor running at a speed of 1,800 r.p.m. The 36-in. machine has a horizontal travel of the tool of 30 in. and a vertical travel of 9 in. The working surface of the table is 21 in. by 44 in. and the height from the floor to the top of the table is 36 in. It is driven by a 10-hp. motor which also operates at a speed of 1,800 r.p.m.

Heavy Duty Face Grinding Machine

THE DIAMOND MACHINE COMPANY, 9 Codding street, Providence, R. I., is exhibiting one of a new series of face grinding machines which differ from the previous series of machines of this type by being equipped with a square end column which adds materially to the strength and also gives a more pleasing appearance to the machine; wider flat ways; deeper vee ways; larger oil pockets and oil rolls which afford better lubrication to the table ways; a new design of table which provides quicker drainage, and a steep sloping watertrough. The operator's position is moved closer to the table, thus giving a better view of the work and easier control of the machine.

These machines are made in two sizes, 30 in. and 36 in. The maximum height that the machines will grind with the front guard plate in place is 20 in. for the 30-in.



Rear View of the Diamond Heavy Duty Face Grinding Machine

machine and 27 in. for the 36-in. machine, and with the front guard plate removed, 24 in. for the 30-in. machine and 31 in. for the 36-in. machine. The maximum length that may be ground on either machine is 84 in. The bed is of the three point type, bearing on the floor with a total length of 134 in. It has a vee way in front $3\frac{1}{2}$ in. wide having a 90-deg. angle, and a flat way at the rear, 4 in. wide. The column, which carries the wheel head, consists of two flat ways, 6 in. wide with a total spread of 30 in.

The total width of the table is 24 in. and the length is 134 in. The platen of the table is in the middle of its length and is 24 in. wide by 86 in. long. It is provided with five tee slots to take $\frac{3}{4}$ -in. bolts. The first slot is $2\frac{1}{4}$ in. from the edge of the platen nearest the abrasive wheel. The slots are $4\frac{1}{8}$ in. center to center. The diameter of the spindle is 5 in. at the front and $4\frac{1}{2}$ in. at the rear bearings for the 30-in. machine and 6 in. at the front and $5\frac{1}{2}$ in. at the rear bearings for the 36-in. machine. The bearings are of the split type and are of bronze with three oil rings in the front and two oil rings in the rear. A ball thrust with threaded adjusting collars eliminates excess spindle end-play.

A 40-hp. 40 deg. type motor operates at speeds of either 900 or 1,200 r. p. m. to suit requirements, and drives the spindle by means of a Morse silent chain and sprockets. The chain is of $\frac{3}{4}$ -in. pitch, 7 in. wide and suitably guarded. The cross belts for operating the table are 2 in. wide. All the table drive gears have cut teeth. The bull gear has a $2\frac{1}{2}$ -in. face.

The machine is provided with a hand cross feed operated from the rear, the total amount of this cross feed being $2\frac{5}{8}$ in. The automatic cross feed has a range of from one to ten thousandths of an inch. One revolution of the rear hand wheel moves the wheel head $1/16$ in. The table traverse is controlled by hand or power from either the front or rear of the machine.

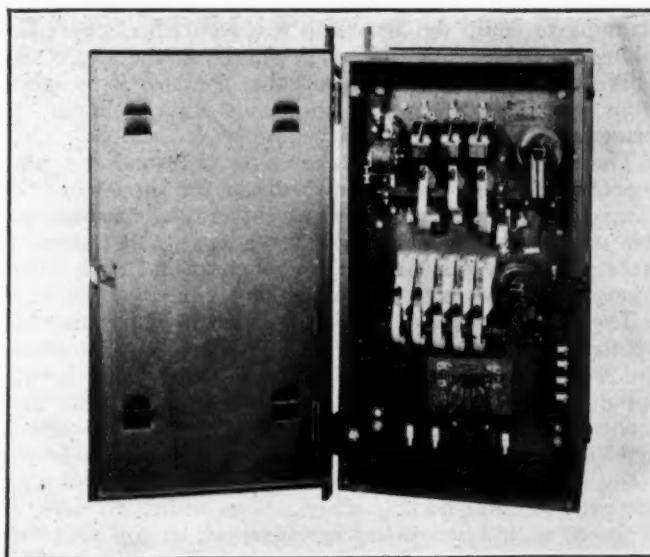
The main water tank has a capacity of 49 gal. and the settling tank 10 gal. The pump is of the submerged centrifugal type with a speed of 900 r. p. m. The machine is provided with two nozzles, each having a discharge opening of $\frac{1}{4}$ in. to $1\frac{1}{4}$ in.

A special sectional wheel chuck is furnished to accommodate 12 abrasive blocks for the 30-in. machine and 15 abrasive blocks for the 36-in. machine. These blocks are $7\frac{1}{4}$ in. deep and either two or three inches in width. These segments are adjustable for wheel wear for more than 6 in. of their depth before renewal. The sectional wheels are considered to be more economical than ring wheels.

The total floor space occupied by either machine is 8 ft. 4 in. front to back and 25 ft. 2 in. from end to end. The net weight of the 30-in. machine without the motor is 13,000 lb. and for the 36-in. machine, 14,500 lb.

Induction Motor Starter

NEW starter exhibited by the General Electric Company, Schenectady, N. Y., bears the type designation CR-7055-A-1. It is a reversing primary resistor starter for squirrel cage induction motors. Two three-pole line contactors are provided with this starter. These contactors are electrically and mechanically interlocked and are mounted back-to-back on the panel. A magnetic time interlock provides a predeter-



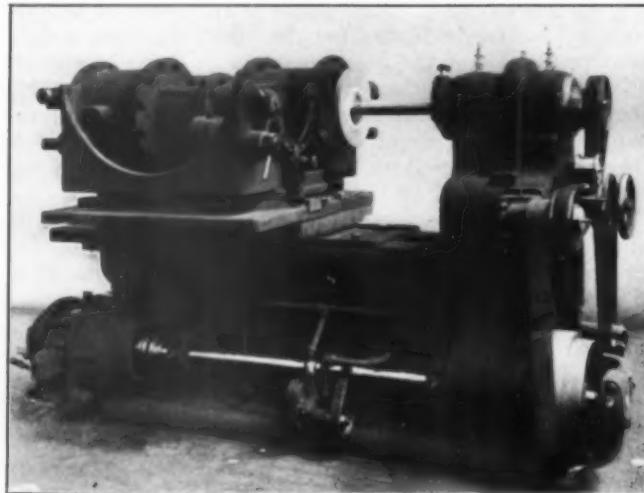
Reversing Starter for Squirrel Cage Motors

mined definite time of from one to three seconds between the closing of the line contactor and of the accelerating contactor.

Two-point starting is provided by a resistor designed to conform to Electric Power Club classification No. 16. A temperature overload relay with an external resetting mechanism furnishes overload protection. The enclosing cast is of sheet metal, semi-ventilated, and is provided with feet for wall mounting. When mounted, the panel occupies a position at right angles to the wall. Doors may be locked and are provided at front and back of the panel.

Internal Grinder for Finishing Compressor Cylinders

A FEATURE of the exhibit of the Heald Machine Company, Worcester, Mass., is an internal grinding machine equipped with a fixture for grinding the cylinders of cross compound air compressors, without separating them from the center piece. This machine is a modified design of the Heald standard No. 50 internal



Internal Grinder Equipped with a Swivel Fixture for Finishing the Cylinders of Air Compressors

cylinder grinder and besides being equipped with the cylinder fixture it is of heavier construction. It is equipped with a standard 15-in. arm, but the manufacturers are planning to equip the arm with a special wheel collet for taking both the large and small wheels on the one collet. This arrangement will permit the operator to change from one size of wheel to the other without having to change collets.

The machine is built with a longer base and the table is provided with a longer finished pad for supporting the fixture, thus giving additional rigidity to the machine for this work. It is also suitable for adapting the standard cross slide table and fixtures for single cylinders or other types of work, as may be desired.

The lower portion of the fixture consists of a cross slide which is mounted on the table of the machine. The cross slide movement is obtained by a cross feed screw having a dial graduated in thousandths. At the side of the base are two adjustable stops on the sliding member and a fixed stop on the stationary member. These provide for ready positioning of the cylinder bores to be ground with the path of the grinding wheel. The sliding member is arranged with a worm and worm wheel, on top of which the cylinder cradle is directly mounted. The worm is operated by a handle at the front of the fixture which permits the cradle unit to be swiveled in a horizontal plane. The cradle is arranged with a fixed stop which comes in contact with the adjustable stops on each side of the upper slide. The adjustment provided by the stops controls the amount of swivel to be obtained and should be adjusted to give exactly 180 deg. swivel.

The cylinder casting is centralized in the cradle of the fixture by locating the center from the chambers at the ends of each bore. This not only gives true alinement, but also places the cylinder bores in such a position that they will be ground to true alinement in case they have been worn out of alinement. This feature is important

for if the cylinders do not line up perfectly, there will be excess friction between the piston and the cylinder wall, or if the cylinders are too much out of line they will not pass federal inspection or the stuffing box packing is apt to be blown.

The cylinder is assembled on the floor or bench with taper plugs and alining bars and is then dropped into the cradle of the fixture. It is located endwise by a set of pins set in the base of the cradle and opposite each end of the outer flanges of the large bores. These pins have varying flats on different sides and at varying distances from the center of the pins which provide for slightly



Air Compressor Cylinder Being Centered in the Cradle of the Fixture

different lengths of cylinders by rotating the pins for the position of the flat desired. The cylinder is dropped between these pins which allow approximately $\frac{1}{8}$ -in. end movement when in place. Located directly under the outer flanges of all four bores are spring resting plungers. The springs under the plungers compress until the ends of the alining bars, passing through the cylinder bores, come in contact with the hardened plates. This positioning of the alining bars places the cylinder bores in a parallel horizontal plane accurate with the original boring and the stuffing box holes.

Equalizing members, having two hardened and beveled cam pieces coming in contact with the inside edges of the projecting ends of the alining bars, are located between the ends of the alining bars at each end of the fixture. These equalizers fulcrum at the center and are operated by a handle, so that the operator when rotating the equalizer brings the cylinder bores, by means of the alining bars, into accurate longitudinal alinement with the machine when the fixture is properly set. The cylinder supporting plungers are then locked into fixed position and the four clamping screws clamp the cylinder into position by acting on the upper portion of the outer flanges of all four bores. With the cylinder thus clamped in fixed position, the horizontal locating arms are lowered away from the ends of the alining bars by rotating the flat on the arm support cam. The locating arms are then withdrawn from the cradle.

The large bore of the cylinder is ground first with the fixture moved back against the rear cross slide stop. On completion of this operation the fixture cradle is rotated 180 deg. and the other large bore is ground. The operator then changes the grinding wheel and proceeds to grind the first small bore which is accomplished by bringing the cross slide forward against the front stop. The fixture is rotated as before and the other small bore is ground.

Float Type Low Water Alarm

FLOAT-OPERATED low water alarms have been successfully used in stationary boilers for a number of years, but the surge of the water has been an obstacle to their use in locomotive boilers. In a new type low water alarm, known, as the Cleveland Float Low Water Alarm just announced by the Talmadge Manufacturing Company, 1279 West Third street, Cleveland, Ohio, and included in this company's exhibit, the float is mounted in an independent chamber above the water level in the locomotive boiler. By referring to the two illustrations the construction and operation of this type of low water alarm may be quite clearly seen.

The float chamber *A* is attached to the boiler shell *B* and contains the copper float *C*, the lowering and raising of which opens and closes the whistle valve *D*, to the

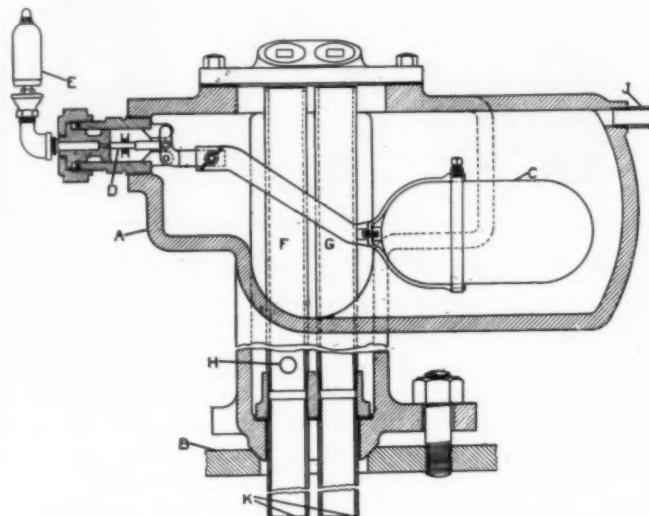


Fig. 1—Sectional View Showing Operating Mechanism

outer end of which is attached the whistle *E*. The water drain pipe *F* and the steam supply pipe *G* are attached to the bottom of the chamber *A* and extend upward to the extreme top of the chamber as well as downward so that the ends *K* are only a short distance above the high point of the crown sheet and, therefore, are normally covered with water. The water drain pipe *F* has a small drain

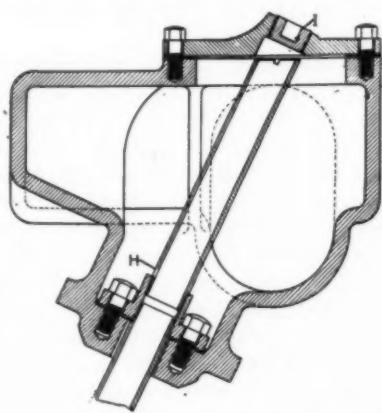


Fig. 2—Section Through Center Line of the Left-hand Tube Shown in Fig. 1

hole *H* near the bottom of the float chamber *A*. A test valve is connected at *J* to the boiler steam space.

Whenever the boiler is under pressure and the water is above the ends of the drop pipes *K*, water is forced up the pipes *F* and *G*. As the steam in the float chamber

condenses, the water rises and quickly fills this chamber, causing the float *C* to raise and close the whistle valve *D*.

When the drop pipes are uncovered at *K*, the water runs out of the pipe *G*, which allows steam to equalize in the top of the float chamber and then the water in the chamber flows by gravity through the small drain hole *H* and out the water drain pipe *F*.

The greater part of the water in the chamber has to run out before the float starts to fall and pull open the whistle valve *D*. This discharge is timed so that the momentary uncovering of the drop pipes due to the surging of the water in a locomotive boiler does not actuate the float and cause the alarm whistle to blow. But in case the pipes are uncovered due to low water, the alarm whistle will continue to sound until the water level is restored sufficiently to cover the ends of the drop pipes *K*.

The functioning of the Cleveland float low water alarm practically depends only on the level of the water in the boiler. After a pressure of a few pounds is reached, the alarm functions uniformly as its action is said not to be affected by firebox temperatures or varying steam temperatures due to changes in pressure.

This alarm can be thoroughly tested at will without lowering the water in the boiler, by opening the test valve *J* which connects the steam space of boiler to top of float chamber, thereby allowing the water to drain out of chamber and the whistle to blow until the test valve is again closed.

No part of the alarm is exposed to firebox temperature. The moving parts are made of non-rusting metals. The maintenance consists of removing the pipe plugs *I* (Fig. 2) occasionally and running a rod through the drop pipes to know that the ends are open.

Improvements in G. & E. Shapers

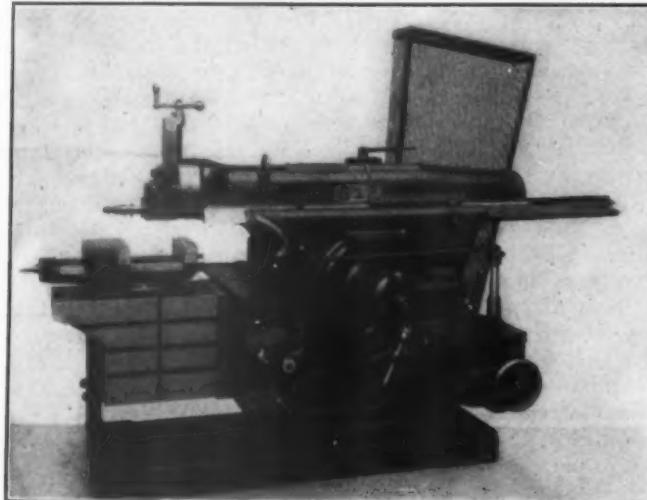
A NUMBER of improvements have been made in the shapers included in the exhibit of Gould & Eberhardt, Newark, N. J. While the outward appearance of the machines has not been greatly changed, an automatic forced-feed lubricating system which includes the ram bearings, as well as the bearings of all other power reciprocated slides or driven shafts, has been incorporated in the design. The oil pump is driven at a constant speed and the oil is conducted to all bearings through tubes. Pins or shafts are drilled and cross-drilled for lubricant when necessary. All outlets lead into oil grooves designed to distribute the lubricant to the best advantage and in all cases provision is made for draining and returning used oil.

The system is designed to flood every bearing surface continuously, at the minimum pressure, but a by-pass valve is provided which may be closed to increase the oil pressure, if that should be desired. The oil is directed down over the moving parts inside of the shaper frame whence it passes to the pump through a filter. Drainage canals and wipers are provided so that oil cannot run down the outside of the machine.

Power is transmitted through a disk clutch mounted on Timken roller bearings and acting on a six-splined shaft. A feature of this clutch is the ease with which it may be adjusted. One clutch-member carries a spring-pin and another has a series of holes for receiving this pin. To adjust the clutch the pin is withdrawn from the hole in which it is inserted and the member which carries the pin is rotated to the right or left to place the pin in another

hole as may be required to cause the clutch to carry a lighter or heavier load.

The table top has been extended, and a stop-pin is provided to prevent the vise from being accidentally shoved off the table. The base has been extended and a new support provided for the table. This support is fastened to and moves with the table, sliding upon a rail secured to the base. The support is lengthened at the bottom so as to increase its effectiveness, especially when the table is set to either end of the cross-rail. If the table-support rail



This G. & E. Shaper Has a New Lubricating System, an Extended Table Top and a Ram Slide Guard

should become worn in service, it may be easily removed and trued up without taking a cut over the base of the shaper.

Another new feature of these shapers is a guard around the ram slide which is secured to the rear of the frame. This guard acts as a safety device to prevent operators from being injured by the ram movement, protects the bearing surfaces of the ram, and catches any oil that might possibly work its way past the grooves on the rear end of the ram bearings.

A new plate-type vise is also provided for use with these machines. In this vise the jaws are close to the table, the graduations are on a large diameter and on an angular surface. It is claimed that when the bolts of this vise are loosened for angular adjustment the vise will not creep on the table.

Insulating Material of Low Conductivity

THE Tuco Products Corporation, 30 Church street, New York, is exhibiting a recent development in insulating material known as Rockwul jacket insulation. This material is made from limestone rock containing no sulphur, and is said not to be affected by temperatures up to and including 1,200 deg. F. Tests of Rockwul made at Purdue University showed that the heat loss per sq. ft. was 4.886 B. t. u. per degree difference in 24 hours, as compared with 5.34 B. t. u. for hair felt. This insulating material is intended for the insulation of tank cars, refrigerator cars, and passenger equipment. It is said to be vermin and mildew proof because of the fact that it is a mineral composition. It is bound together with wire mesh on each side and interlaced with tie wire.

Threadless Washout Plugs for Locomotive Boilers

AMONG the exhibits of Dromgold & Glenn, 332 South Michigan avenue, Chicago, is a threadless washout plug, the parts and assembly of which are shown in the illustration. This plug, shown at the left of the illustration, consists essentially of a sleeve which can be welded or tacked into the mud ring of the boiler. It has a lug on the inside end which slips through grooves on the inside of the sleeve, shown in the center of the illustration, and is held securely in place by turning to the left, which brings the lug of the plug out of line with the grooves.



Details of the D. & G. Threadless Washout Plug

The plug cannot be moved either way by pressure of steam, and it cannot be incorrectly applied in the sleeve. Expansion of the stem causes the plug to tighten and it cannot blow out if only partly tightened. If the plug is not tight, it will leak so badly that the boiler cannot be filled and, when tightened by hand will hold 200 lb. pressure. An additional safety feature has been incorporated in this device by the application of a set screw to the side of the sleeve which, when screwed in its full length, engages a cam surface on the plug, which prevents it from turning.

Lateral Motion Device for Dalman Truck Side Frame

THE Standard Car Truck Company, McCormick Building, Chicago, is exhibiting a recent development of the Barber lateral motion device for use with the Dalman truck side frame. Designs of drop forged roller seats have been developed to suit the different capacities in that type of truck. The limiting stop for lateral motion is provided by lugs on each side of the truck bolster, which are $2\frac{1}{8}$ in. less than the distance between the legs of the channel column. This provides an average of $1\frac{1}{16}$ in. travel each side for the bolster. The side frame for the 50-ton type is equipped with four double coil springs at the center and two single coil springs, one on each side. A 70-ton truck, as built for ore service, has five double coil springs at the center and one double coil spring at each side. If lighter spring capacity is desirable, any of the inner coils may be removed and thus any spring loading desired may be obtained. With a short wheelbase a 70-ton roller seat carries four 10-in. rollers on each seat. The same arrangement of lugs is used on the standard 5-ft. 8-in. side frame, but the length of the roller seat is slightly increased.